Stakeholder Forum

Chicago, Illinois

December 16, 2003

Polychlorinated Biphenyls (PCBs)

Work Group Co-Chairs:

Ken De, Environment Canada

Tony Martig, U.S. EPA

PCB Challenges

Canada

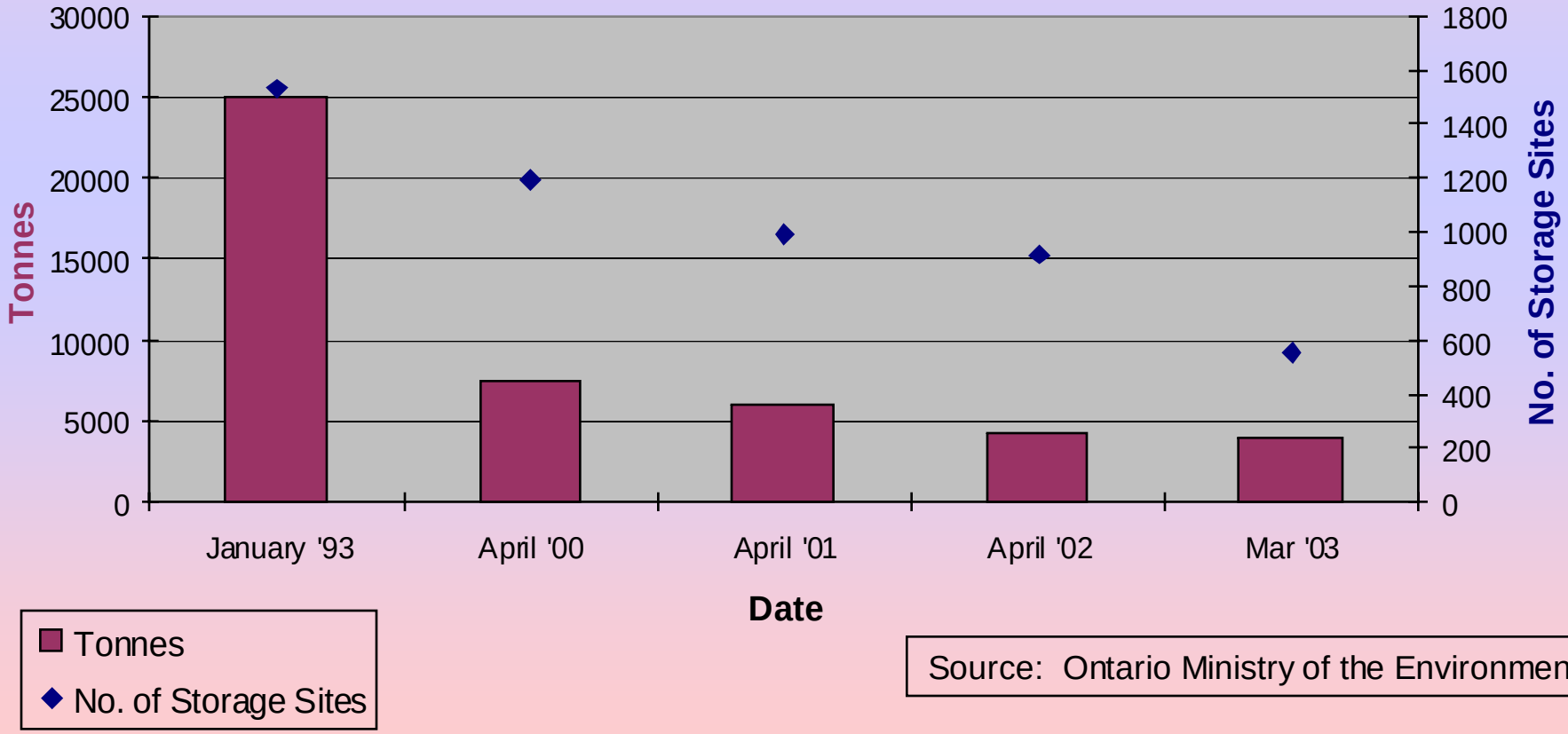
"Seek by 2000, a 90% reduction of high-level PCBs (>1% PCB) that were once, or are currently, in service and accelerate destruction of stored high-level PCB wastes which have the potential to enter the Great Lakes Basin, consistent with the 1994 COA."

United States

"Seek by 2006, a 90% reduction nationally of high-level PCBs (>500 ppm) used in electrical equipment. Ensure that all PCBs retired from use are properly managed and disposed of to prevent releases within or to the Great Lakes Basin."

Progress on the Canadian PCB Challenge (1994-2002)

High-Level PCBs and Number of Storage Sites in Ontario, Canada



Source: Ontario Ministry of the Environment

Progress on the Canadian PCB Challenge (1994-2002)

High-Level PCBs Destroyed

- As of March 2003, approximately 85 percent of high-level PCB (Askarel >1%, 10,000 ppm) wastes had been destroyed in Ontario, up from approximately 40 percent in spring 1998
- Over the past two years, approximately 1,300 tonnes of high-level PCBs were destroyed
- As of April 2003, approximately 983 storage sites (both federal and private) were PCB-free (about 555 sites still remaining)

Progress on the U.S. PCB Challenge

PCB Disposal

- Currently compiling new U.S. disposal data (2001/2002)
- At last update, ~129,000 PCB transformers and 1.3 million PCB capacitors remained in use in PCB equipment
- Due to data gaps, the amount of PCB equipment remaining in use is likely less
- The recent time-average reported disposal rate of PCB transformers and capacitors is 10,000 and 20,000 per year, respectively, from 1994 and 2000

Accomplishments Highlights: PCB Reduction Activities

Workgroup Efforts

- Workgroup Communication Efforts
- Accelerating Phase-Out of PCB Transformers: The Business Case
- International Standards Organization (ISO) 14001 and PCBs

Research

- Source Profiles and Emissions Quantitation of PCBs to Ambient Air from Transformers

United States PCB Reduction Activities:

- U.S. PCB Phase-out Projects (National, Regional)
- U.S. PCB Phase-Out at Federal Facilities
- MPCA (Minnesota Pollution Control Agency) Small Quantity PCB Owner Disposal Cooperative

PCB Workgroup web site:
www.epa.gov/glnpo/bns/pcb

Accomplishments Highlights: PCB Reduction Activities

Canadian PCB Reduction Activities:

- PCB Phase-Out Awards Program in Ontario, Canada and Canadian Case Studies
- Canadian Great Lakes GLBTS PCB Newsletter
- The first four Canadian award plaques were presented to: Stelco Steel (Stelpipe Division), Hydro One, Slater Steel, and Enersource Hydro Mississauga.

Accomplishments Overview

Regulatory Activities

United States

- **RCRA** (See *Federal Register* of July 30, 2003, final rule, effective September 9, 2003)

Canada

- **Chlorobiphenyl Regulations**
- **Storage of PCB Material Regulations**
- **PCB Waste Export Regulations**
- **Federal Mobile PCB Treatment and Destruction Regulations**
  (Revised regulations expected in the Canada Gazette in early 2004)
- **For additional information, see the Environment Canada website:** ***http://www.ec.gc.ca/pcb***

Barriers/Challenges

Continue to be:

- Lack of regulations requiring PCB reductions
- Need to implement incentives to achieve voluntary reductions
- Need improved communication with and involvement of stakeholders

Upcoming Activities

- Continue seeking PCB reduction commitments
- Continue outreach efforts
- Continue with " Recognition & Award" program
- Continue PCB source emission studies
- Pursue New Initiatives (e.g. Incentives, ISO 14001, Insurance)
- Develop National Compliance Promotion/Workshop Strategy and use it for Canada's New PCB Regulations

Dioxins and Furans

Work Group Co-Chairs:

Anita Wong, Environment Canada

Erin White Newman, U.S. EPA

Dioxin/Furan Challenges

Canada

- 90% reduction *
- by 2000

* All media within Great Lakes Basin

United States

- 75% reduction *
- by 2006

* Aggregate of air releases nationwide and water releases within the Great Lakes Basin

Progress

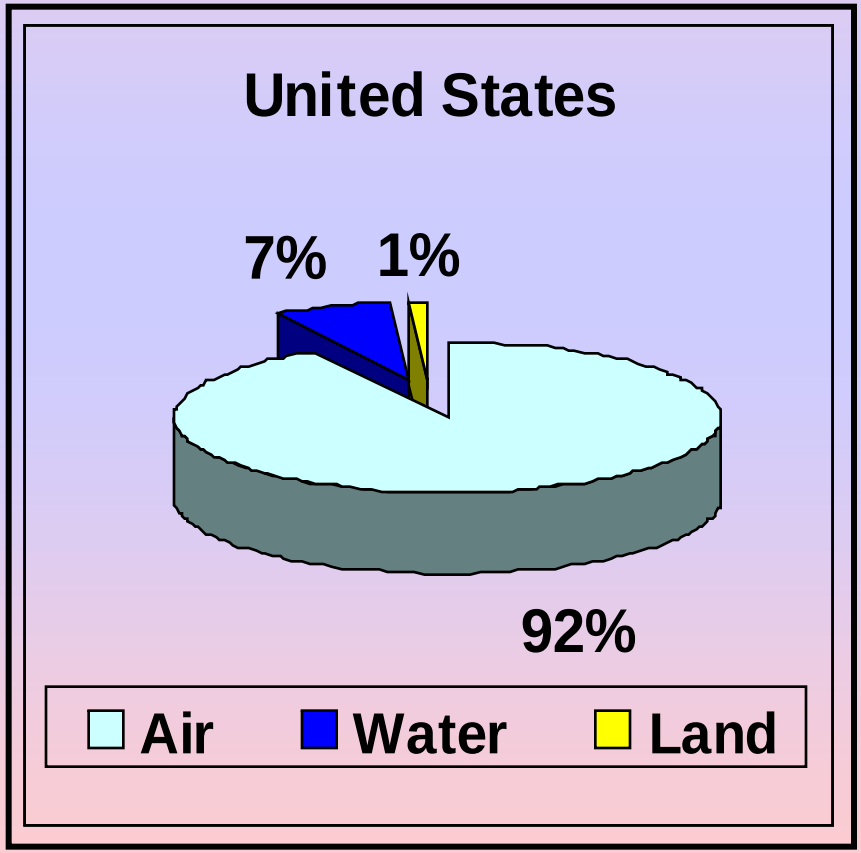
Canada:

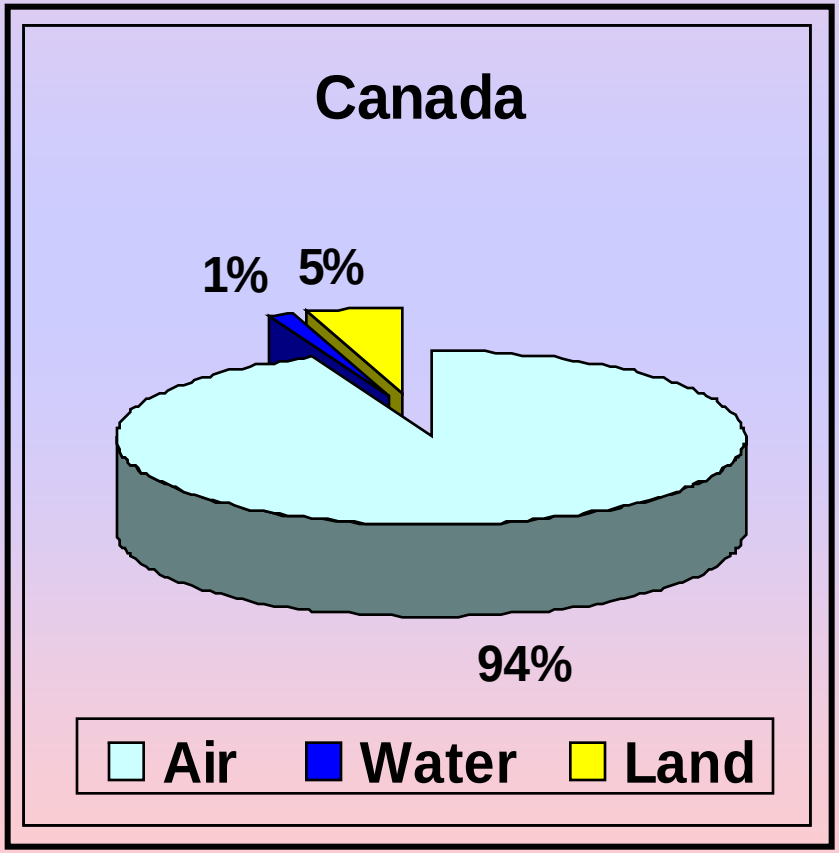
- 83% (213 grams) reduction on total release within GL Basin
- Total release in 2001 = 45 grams

United States

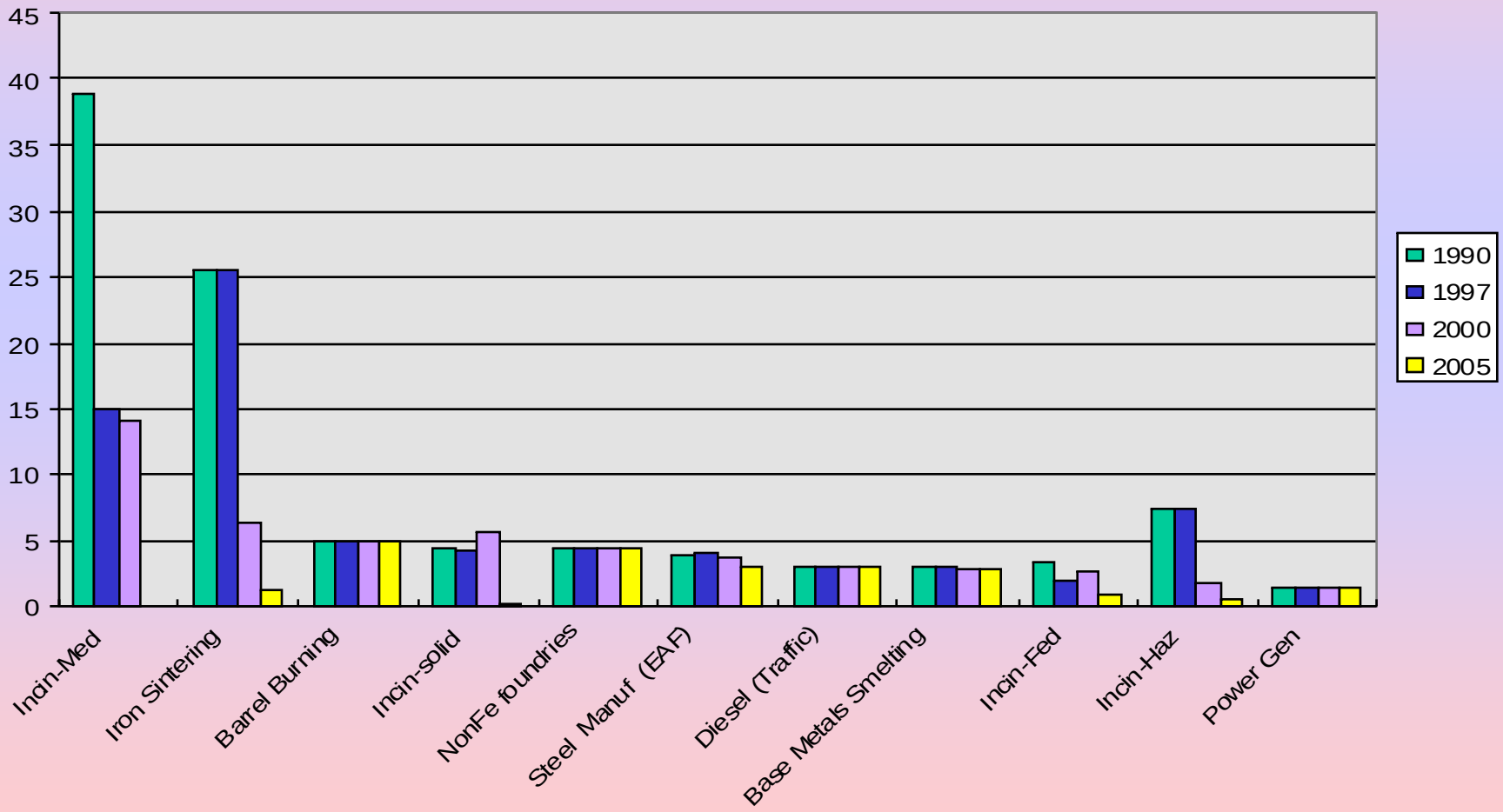
- 77% (10,743 grams) reduction on total release within U.S.
- Total release in 1995 = 3,252 grams

Dioxin Sources by Environmental Media

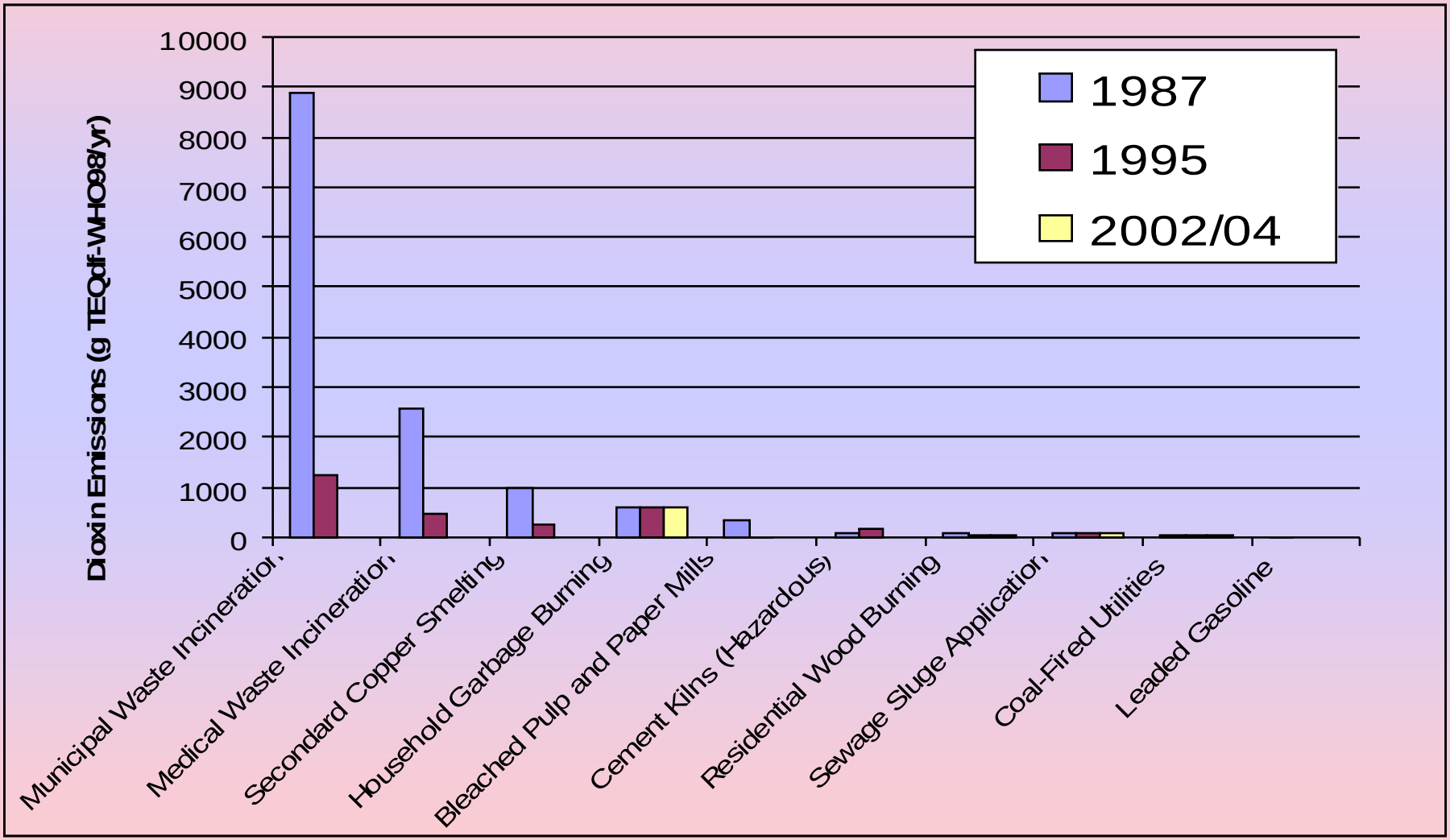




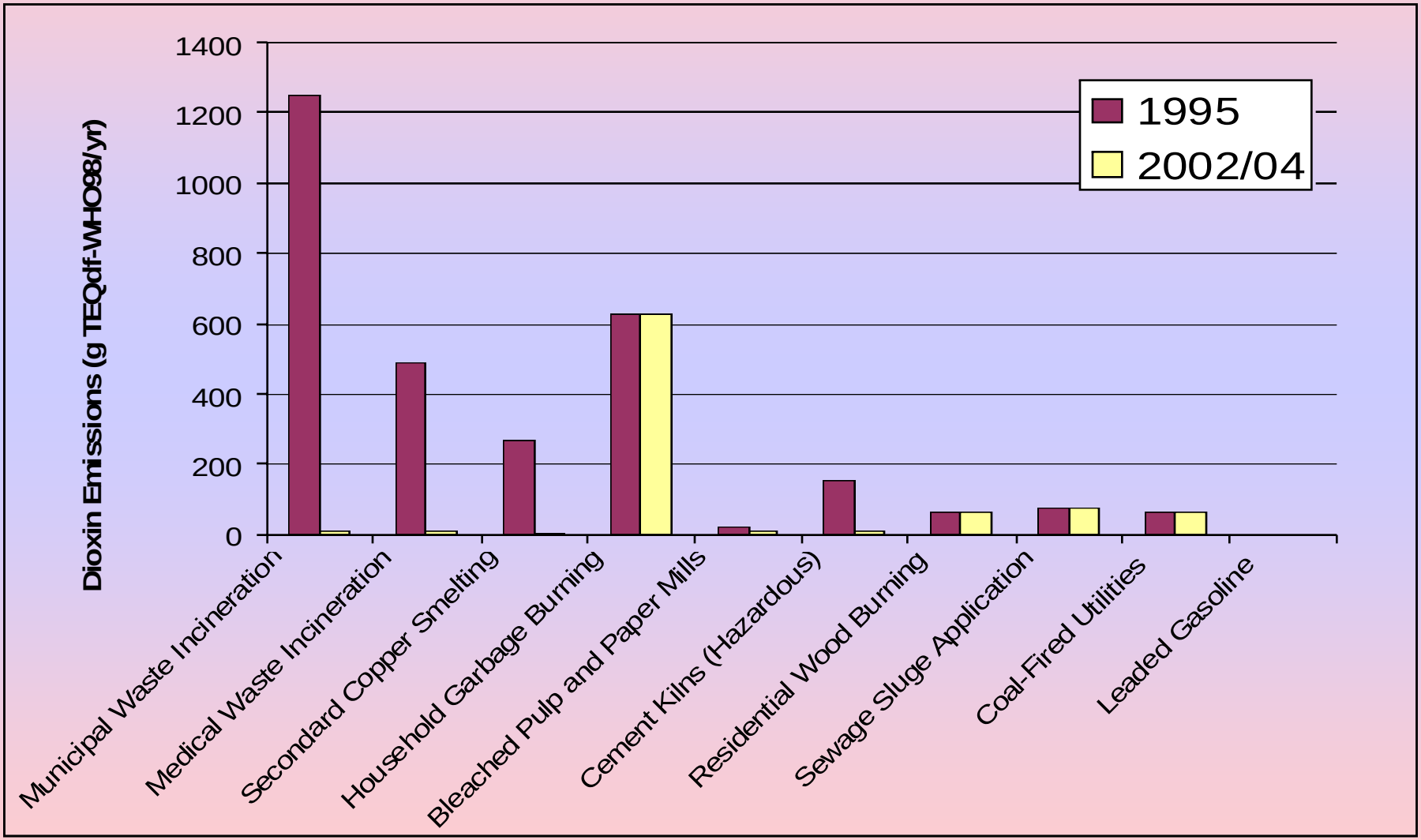
Ontario D/F Air Releases and Forecast (grams per year)



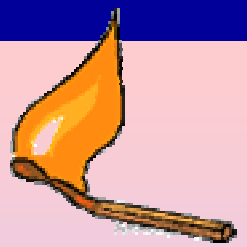
Top U.S. Sources of Dioxin Emissions



Top U.S. Sources of Dioxin Emissions



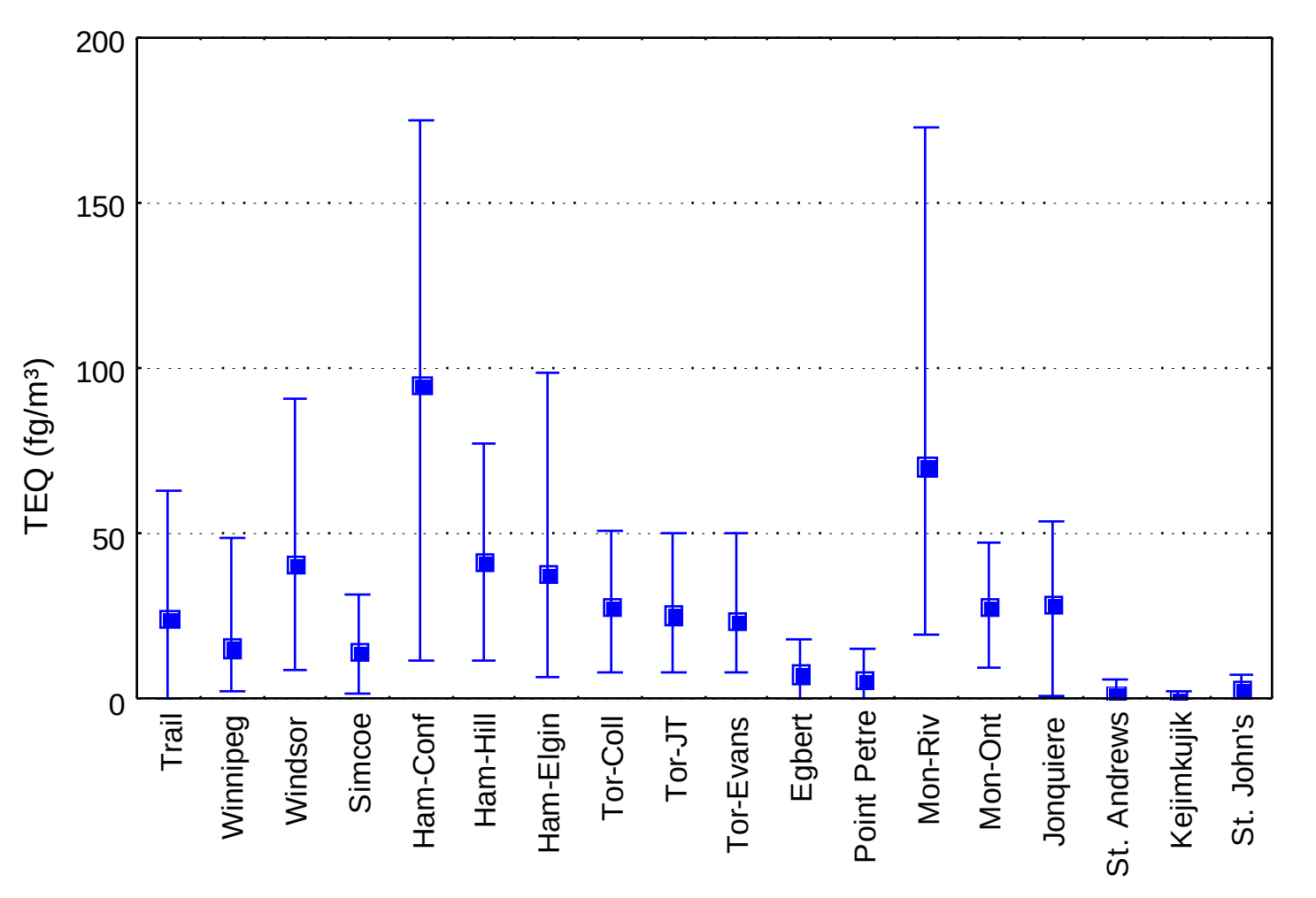
Poorly Characterized Sources



- Secondary metal smelting
- Coke production
- Ceramic manufacturing
- Clay processing
- Foundries
- Asphalt mixing
- Primary magnesium
- Petroleum refineries
- Boilers
- Residential wood burning
- Crematoria
- Forest fires
- Brush fires
- Range fires
- Agricultural burning
- Landfill Fires
- Structural fires
- Ash Disposal
- Copper wire recycling
- Rural soil erosion
- Urban runoff
- Utility poles and storage yards
- Landfill fugitive emissions
- Transformer storage yards

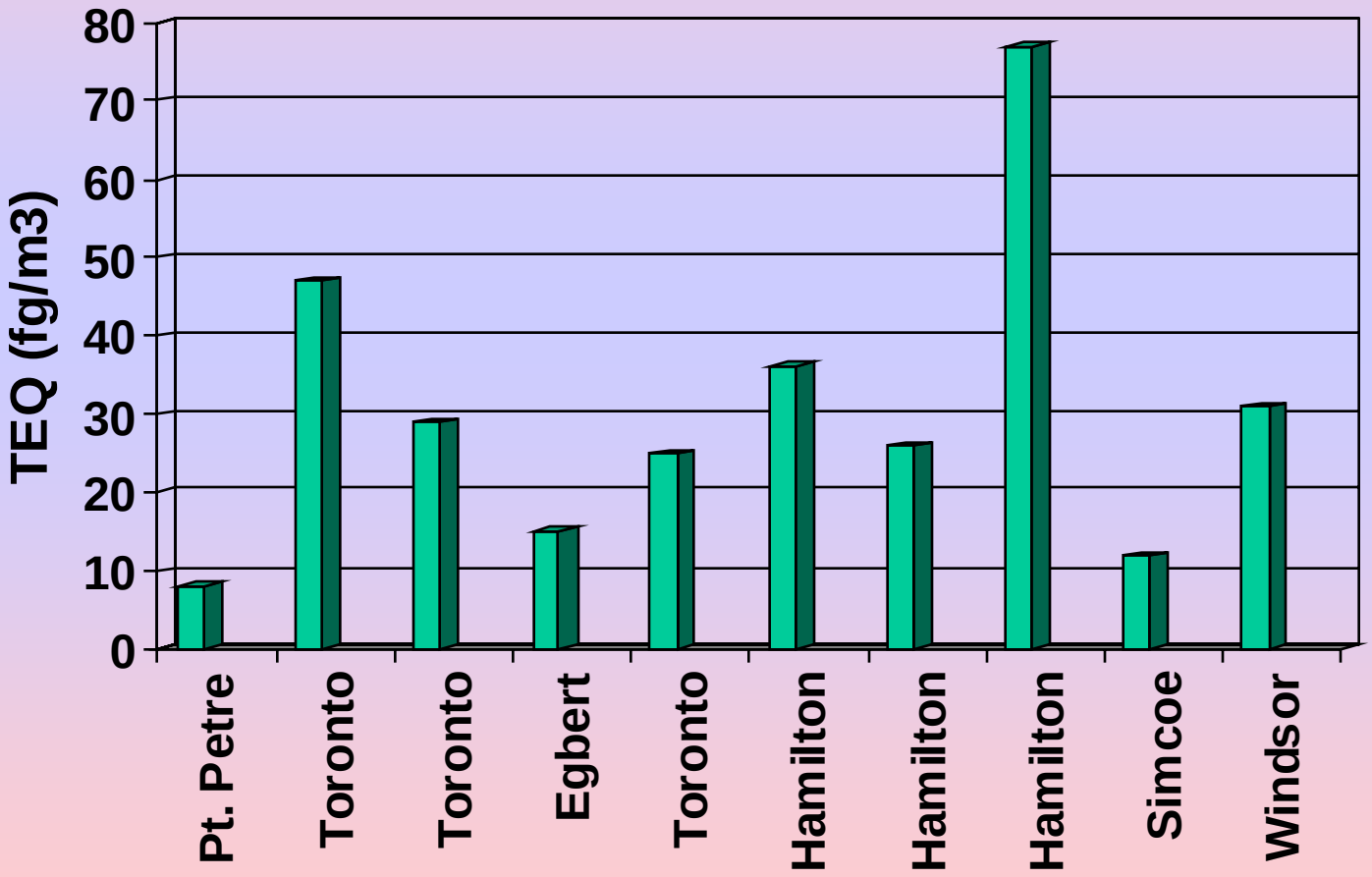
NATIONAL PCDD/PCDF DATA FROM THE NATIONAL AIR POLLUTION SURVEILLANCE NETWORK (NAPS)

Mean, 10th and 90th Percentile TEQ Concentrations (fg/m³) by Site (1999-2001).

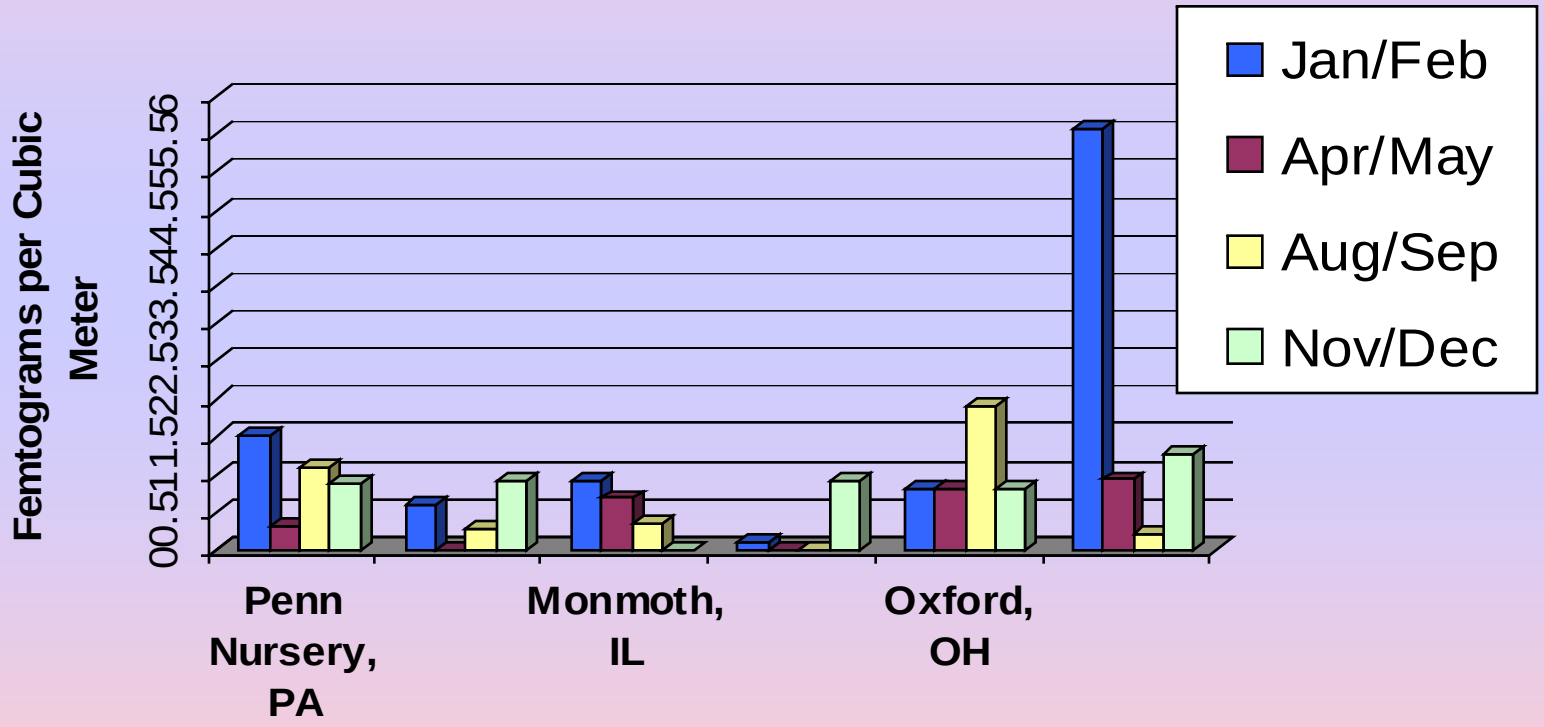


ONTARIO PCDD/PCDF DATA FROM THE NATIONAL AIR POLLUTION SURVEILLANCE NETWORK (NAPS)

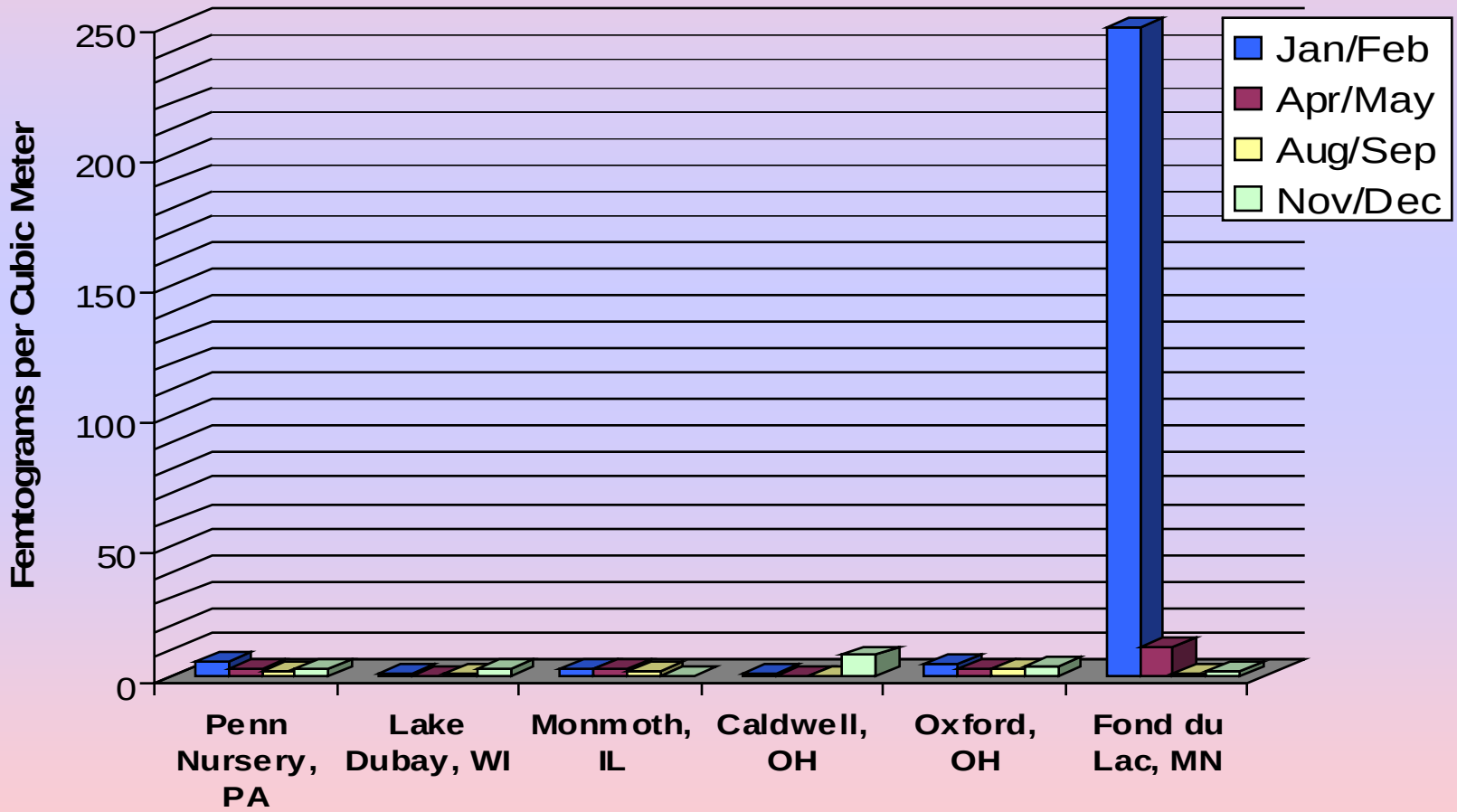
Mean TEQ Concentrations By Site (2002-2003)



2,3,7,8 TCDD - 2000 Data from the National Dioxin Monitoring Network (NDAMN)



2,3,7,8 TCDF - 2000 Data from the National Dioxin Air Monitoring Network (NDAMN)



Workgroup Accomplishments

1998-1999

- Developed Decision Tree to prioritize issues

1999-2000

- Established priority sectors list

2000-2002:

- Gathered information (USWAG, stack tests, ash management, landfill fires, burn barrel, supported wood stove study, secondary metal smelting)
- Monitored existing initiatives (MACT implementation, Canada-wide Standards etc.)
- Developed reduction strategy for one sector (Burn Barrels) through a subgroup, Bruce Gillies - EC lead
- Supported national initiatives

Household Garbage Burning

- Includes open burning of garbage on homeowners' property in barrels, woodstoves, open pits, outdoor furnaces, etc.
- See subgroup's website at *www.openburning.org* for background information, emissions studies, a draft strategy to reduce this behavior, outreach materials, and more.

Household Garbage Burning

<u>Education/Outreach</u>

- EcoSuperior, Lake Superior watershed, Ontario
  - Continued media campaign (TV, radio, website); parks/campground campaign - garbage bags printed with logo, tags for firewood bundles, flyers
- Wisconsin DNR, and University of Wisconsin Extension
  - New Education Outreach Kit – Air Defenders
- Western Lake Superior Sanitary District
  - Completed survey of local U.S. decision makers
- EPA Region 5 continues meeting with states and tribes
  - Prioritized grant funding for burn barrel projects
- USEPA Office of Solid Waste
  - New national brochure and website

Educational Outreach Information

www.airdefenders.org

U.S. EPA Website

www.epa.gov/msw/backyard

EPA: Backyard Burning - Microsoft Internet Explorer

File Edit View Favorites Tools Help Address http://www.epa.gov/msw/backyard/ Go

Links R5 ARD Google Customize Links Free Hotmail

U.S. Environmental Protection Agency

Backyard Burning

Recent Additions | Contact Us | Print Version Search: GO

EPA Home > Wastes > Backyard Burning

- Where You Live
- Basic Information
- Human Health
- Environmental Effects
- What You Can Do
- Publications
- Tribal Programs
- Related Links

Backyard Burning

Burning household waste in your backyard is harmful to your health and the environment. This site explains these problems and provides alternatives.

- Where You Live: information on what your state and community are doing about backyard burning.
- Basic Information: the history and background of backyard burning.
- Human Health: details on the dangers of backyard burning.
- Environmental Effects: details on how backyard burning hurts the environment.
- What You Can Do: alternatives to backyard burning for communities and individuals.
- Publications: brochures, slide presentation, and photo gallery.
- Tribal Programs: brochures for tribes, case studies, and links to several tribes' open burning Web sites or open burning codes.
- Related Links: links to other backyard burning related Web sites.

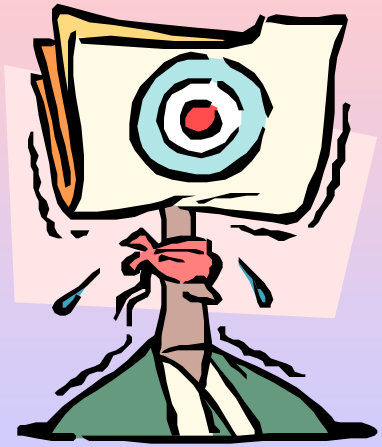
Local intranet

Start | Plenary Dec 16_03.ppt | EPA: Backyard Burni... | 5:00 PM

Recent Workgroup Accomplishments

- Developing a new work plan
  - Continue to support national programs
  - Continue to support efforts on burn barrels
  - Investigate available data for monitoring/emissions inventory to determine environmental trends and releases
  - Prioritize sector list
  - Outreach to representatives of other sectors
  - Discuss joint priorities with other BTS workgroups (eg. common sectors, coplanar PCBs)

Targets for Today



- Finalize the D/F work plan
- Finalize the Burn Barrel Strategy
- Present information on coplanar PCBs in conjunction with the PCB workgroup
- Discuss reduction opportunities for new source categories
- Discuss reduction opportunities, joint efforts with other substance workgroups

Benzo(a)Pyrene
Hexachlorobenzene

Work Group Co-Chairs:

Tom Tseng, Environment Canada

Steve Rosenthal, U.S. EPA

B(a)P and HCB Challenges

United States

"Seek by 2006, reductions in releases that are within, or have the potential to enter, the Great Lakes Basin, of HCB and B(a)P from sources resulting from human activities"

Canada

"Seek by 2000, a 90% reduction in releases of HCB and B(a)P resulting from human activities in the Great Lakes basin, consistent with the Canada Ontario Agreement"

Accomplishments:

Estimated Reductions (since ~ 1988):

Canada: (Great Lakes)

- HCB ~ 62% reduction
- B(a)P ~ 45% reduction

United States:

- HCB (nationally) ~ 90% reduction from chlorinated solvents and pesticide manufacturing
- B(a)P (Great Lakes) ~ 65% reduction from coke ovens and an over 90% reduction from primary aluminum reduction plants and petroleum refineries

Accomplishments: Recent Canadian Progress

- 60 "Burn it Smart!" wood stove workshops conducted in 32 Ontario communities (1300 people attend)
- Ontario's on-road motor vehicle sector releases updated and being reviewed with interested parties
- Canada Ontario Agreement workplans being implemented: commitments resulting in additional reductions
- Integrated steel mills on track to meet coke oven PAH/B(a)P reduction targets

Overview of Canadian B(a)P and HCB Reductions

B(a)P:

- Residential Wood Combustion: Stove change-out and outreach impacting on releases (Burn it Smart! workshops)
- Iron and Steel: Voluntary agreements and new SOP sector codes of practice bringing about significant reductions
- Wood Preservation: New SOP codes of practice being implemented at creosote facilities

HCB:

- Chemical production sector in Ontario reporting little HCB release
- Implementation of new mercury Canada Wide Standards for incinerators (municipal, hazardous, sewage sludge and biomedical wastes) also reducing HCB
- Critical data gap - uncertainty on HCB release estimates associated with the application of pest control products

Accomplishments: Recent United States Progress

- Wood Stove Change-out Programs with Hearth Products Association completed in 12 States
- Discussions with the scrap tire sector to reduce fires
- A rule to control emissions of toxic air pollutants during hydrochloric acid production should reduce HCB emissions
- Test results reveal that petroleum refineries are no longer significant B(a)P sources
- Several chemical companies have greatly reduced or eliminated their HCB emissions
- Primary Aluminum B(a)P emissions have been controlled from sources around the Great Lakes
- EPA has recently initiated an effort to encourage switching to gas and EPA-certified woodstoves and encourage best practices for the operation of woodstoves and fireplaces, as well as to develop outreach materials to reduce wood smoke.

Overview of United States B(a)P and HCB Reductions

B(a)P:

- Residential Wood Combustion: Steady decrease in emissions due to change-out programs and outreach
- Petroleum refining: Test data indicates that this is no longer a significant source
- Coke Ovens: Continued decrease in emissions
- Primary Aluminum- Alcoa's Warrick Plant reduced emissions over 95%

HCB:

- Southwire, GA: Air releases reduced from 15 lbs/yr to 0 lbs/yr
- Dow, Texas: Air releases reduced from 237 lbs/yr to 22 lbs/yr
- Ash Grove Cement UT: Air releases reduced from 808 lbs/yr tp 0 lbs/yr
- Du Pont Deslisle Plant, MS: Water releases reduced from 43 lbs/yr to 0 lbs/yr

Major Source Sectors

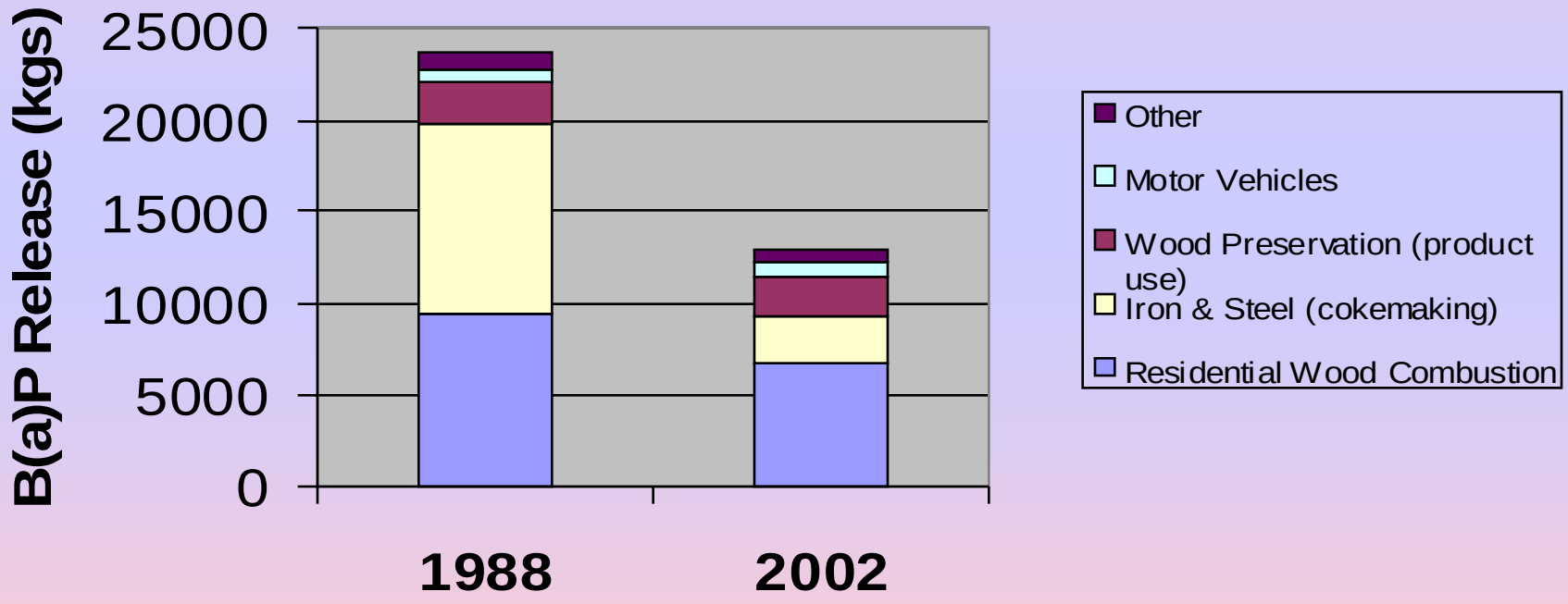
B(a)P:

- Coke ovens
- Wood preservation
- Residential wood combustion

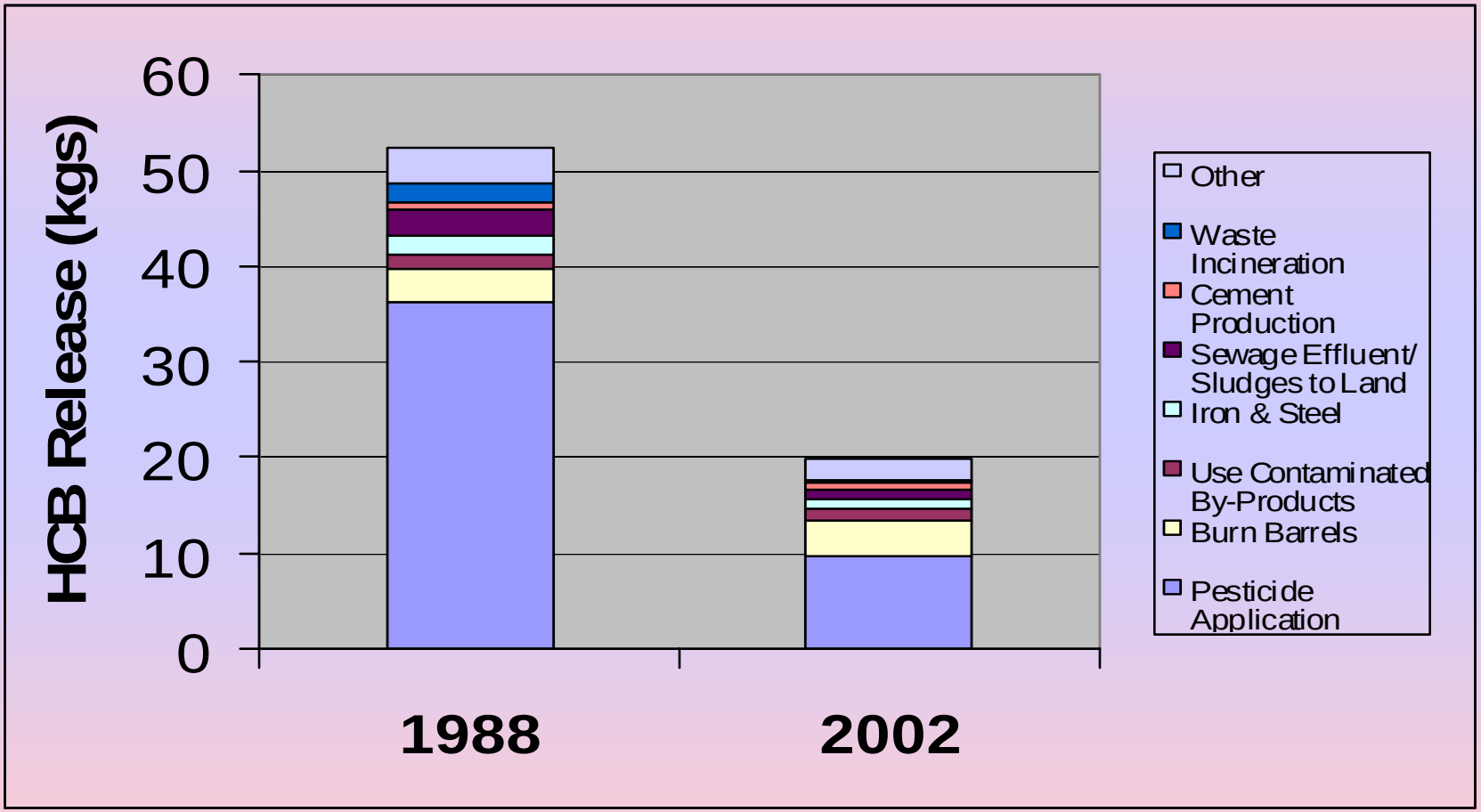
HCB:

- Chlorinated solvents and pesticides manufacturing
- Chlorine production
- Pesticide applications
- Waste incineration

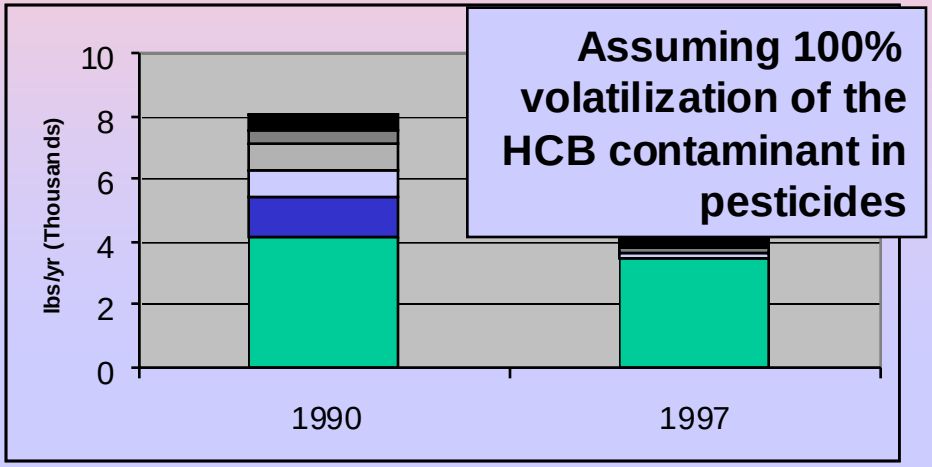
Estimated Ontario B(a)P Releases

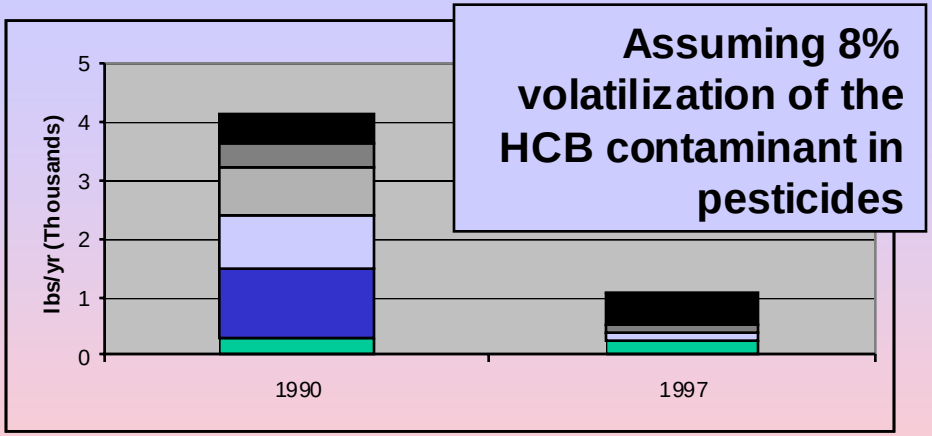


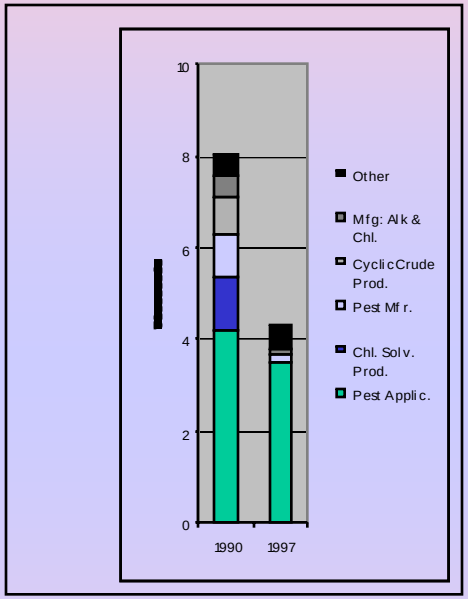
Estimated Ontario HCB Releases



Estimated United States HCB Emissions



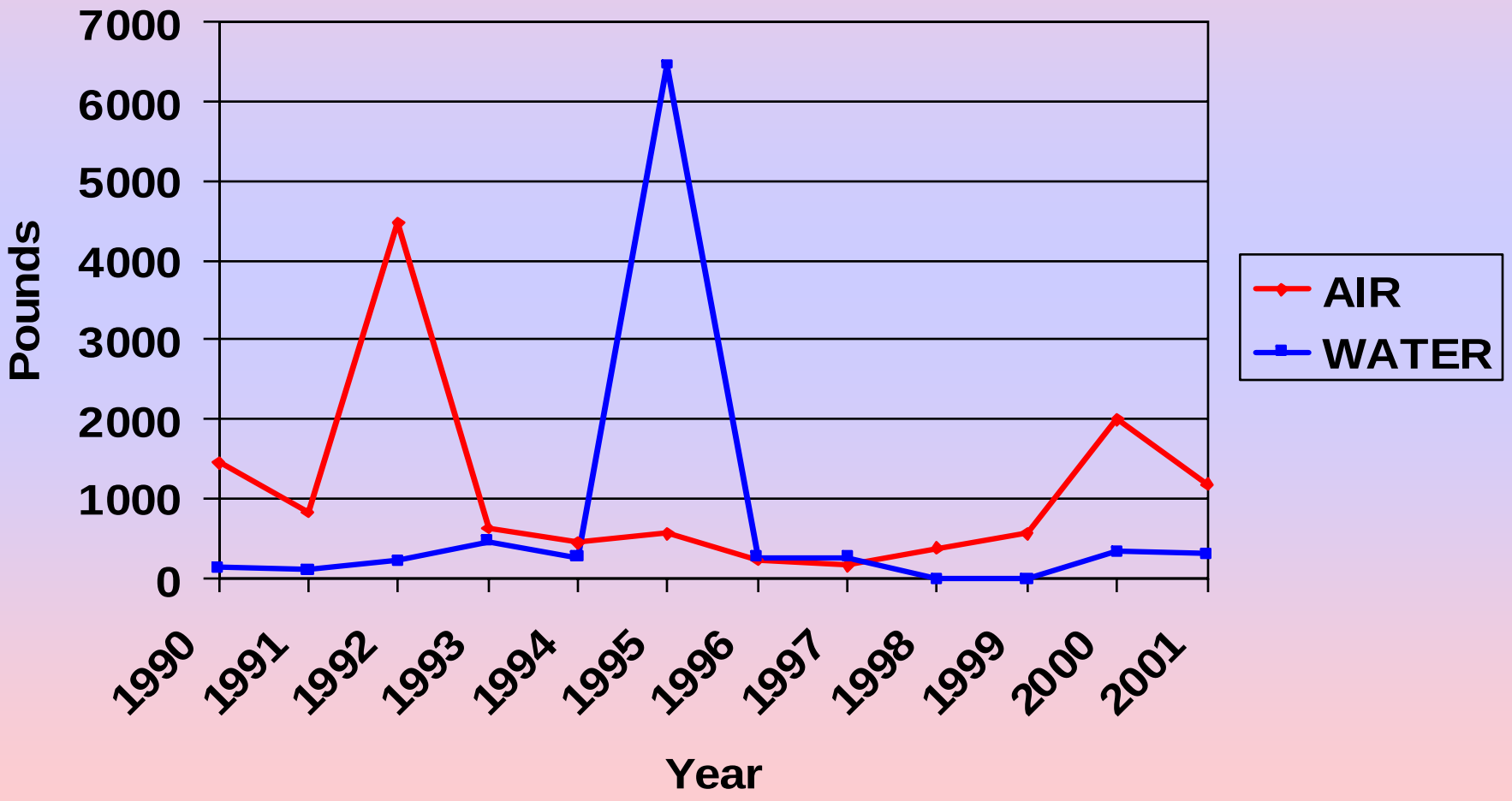




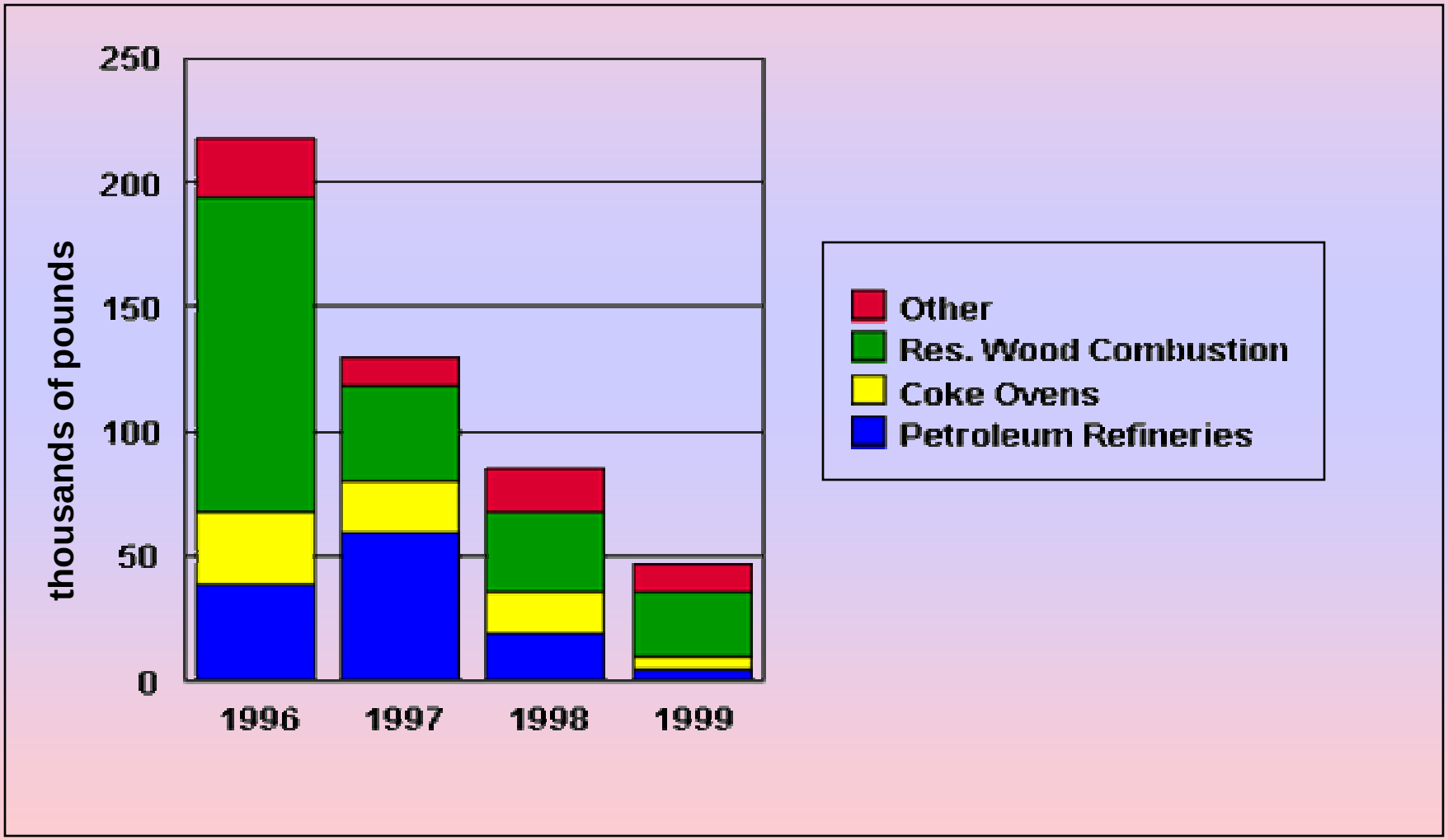
Sources:

EPA 1990 and 1996 National Toxics Inventory data updated with recent TRI data and other information

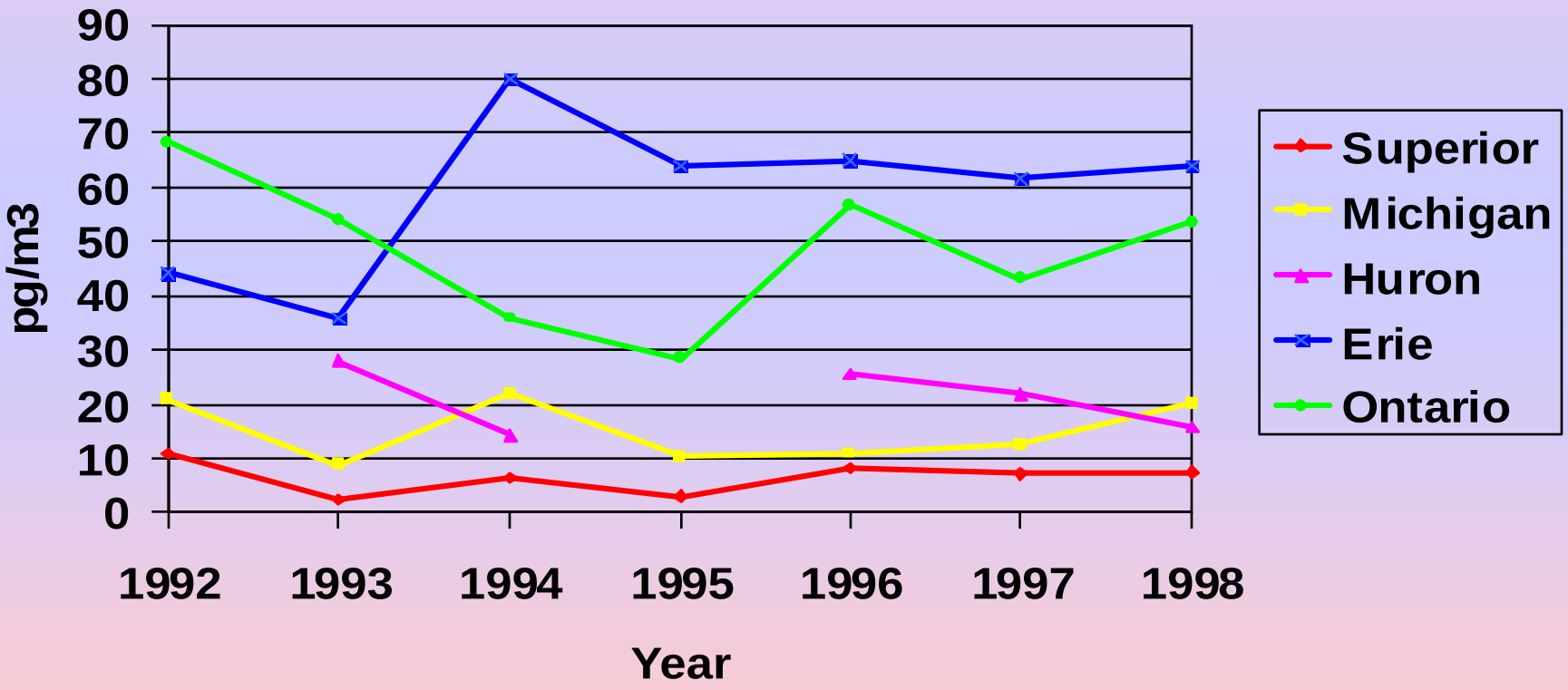
U.S. HCB TRI-Reported Emissions (lbs/yr)



Great Lakes B(a)P Emissions



Concentrations of B(a)P in Particulate Phase
(IADN Monitoring Data)



Barriers

- Lack of chemical use and emission data
- Missing B(a)P sources as reflected by Air Quality Trend Data
- Many source sectors
- Need to recruit Work Group members
- Need resources to initiate more sector-specific projects
- Non-point sources beginning to dominate; technological and societal changes required to effect significant reductions

Upcoming Actions

- Work with pesticides, auto manufacturing and other sectors to refine release estimates
- Continue outreach on residential wood combustion
  - Conduct more "Burn it Smart!" workshops in Ontario
  - A Voluntary Woodstove/Fireplace Smoke Reduction Activities and Outreach Materials Contract (awarded by EPA)
- Meet with facilities not reporting or with "Low Confidence" NPRI estimates
- New prevention projects — e.g., scrap tires
- Assess results of study to verify product HCB contamination levels
- Assess results from voluntary stack testing initiative

Mercury

Work Group Co-Chairs:

Robert Krauel, Environment Canada

Alexis Cain, U.S. EPA

Canada's Mercury Reduction Challenge and Progress

Challenge:

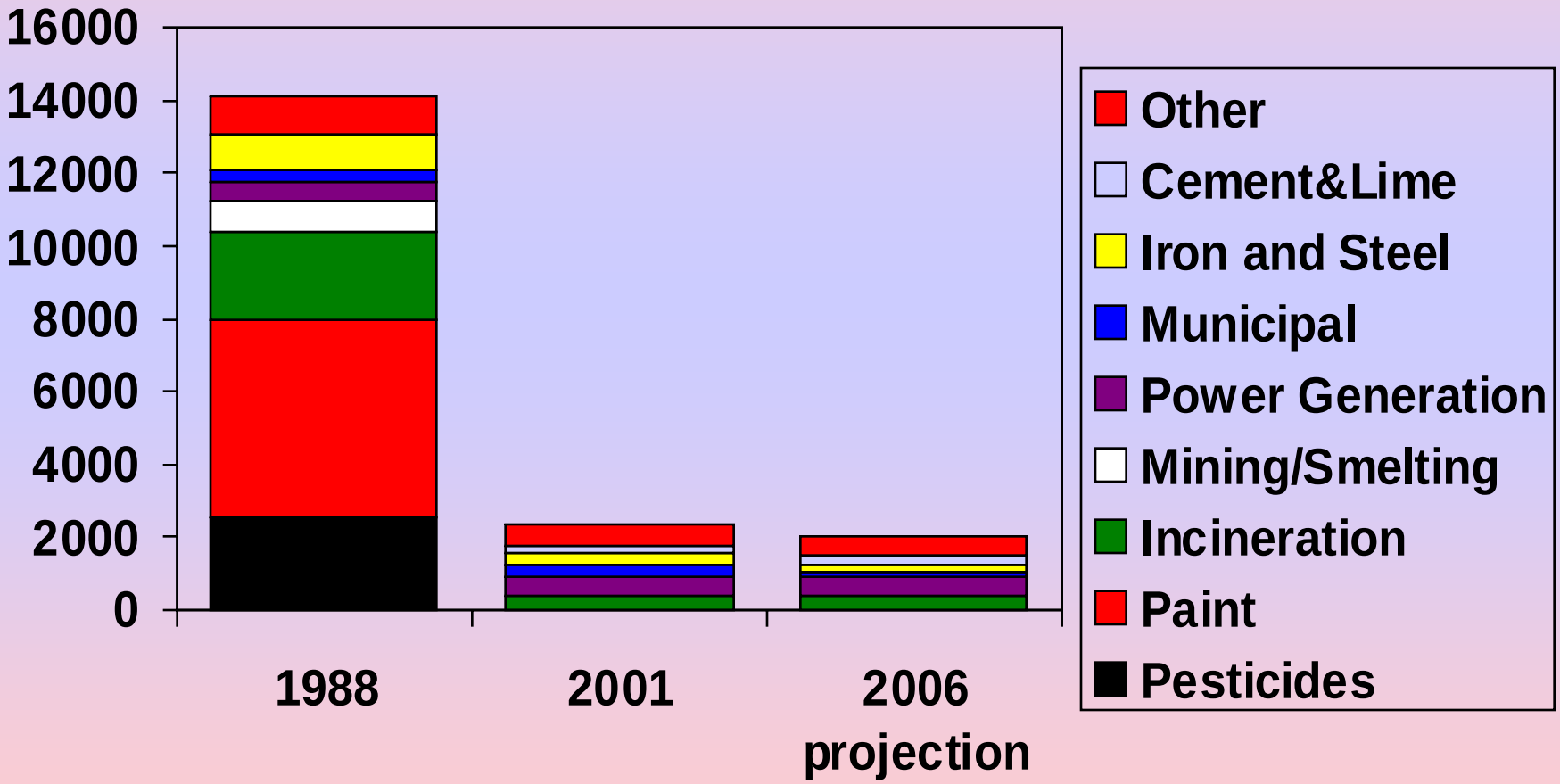
"Achieve by 2000, a 90% reduction in the release of mercury, or where warranted the use of mercury, in the Great Lakes Basin"

Baseline: 1988

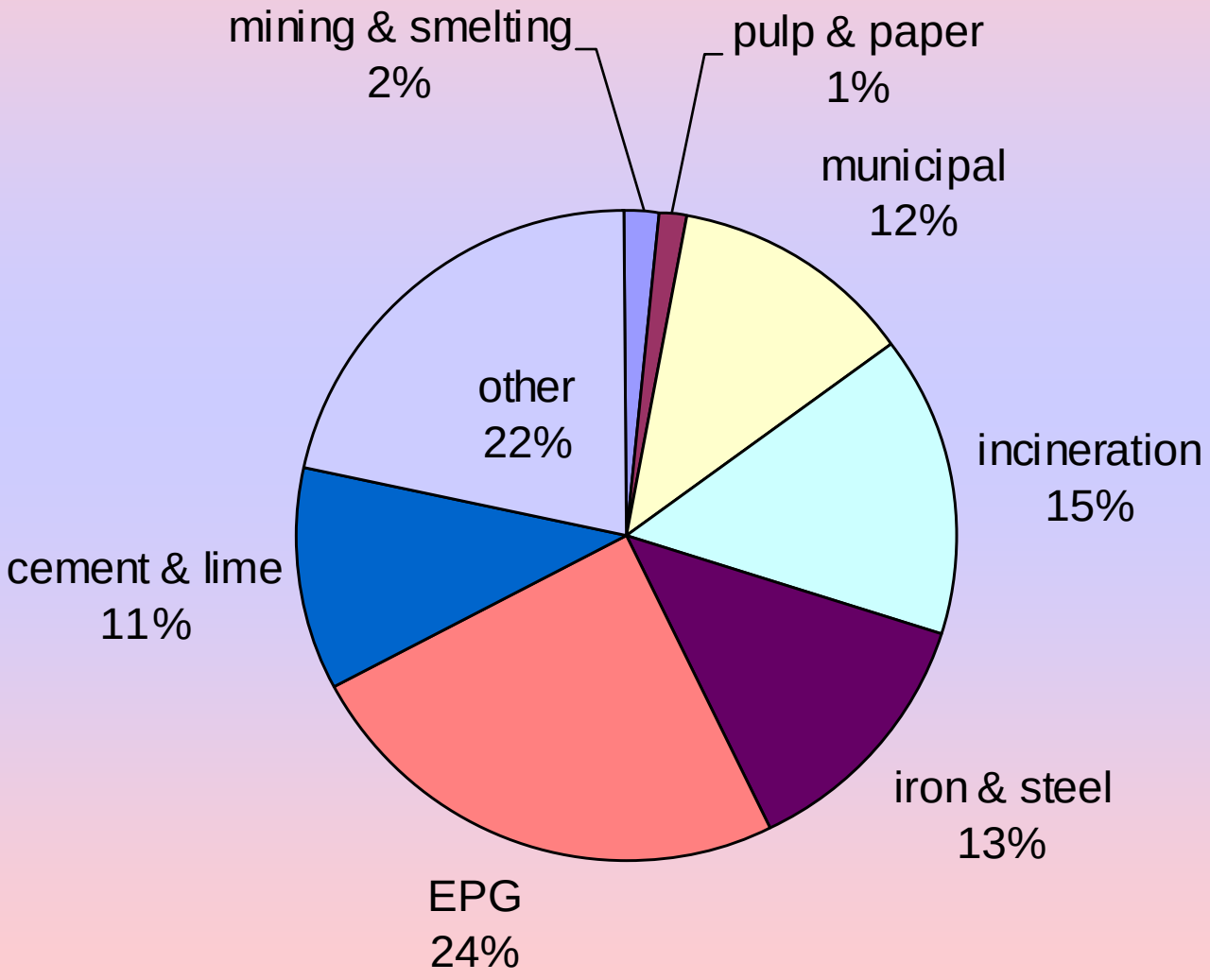
Progress:

- **Approximately 83% reduction by 2001**

Ontario Mercury Releases (kg)



Sources of Mercury Releases in Ontario



United States Mercury Reduction Challenge and Progress

Challenge:

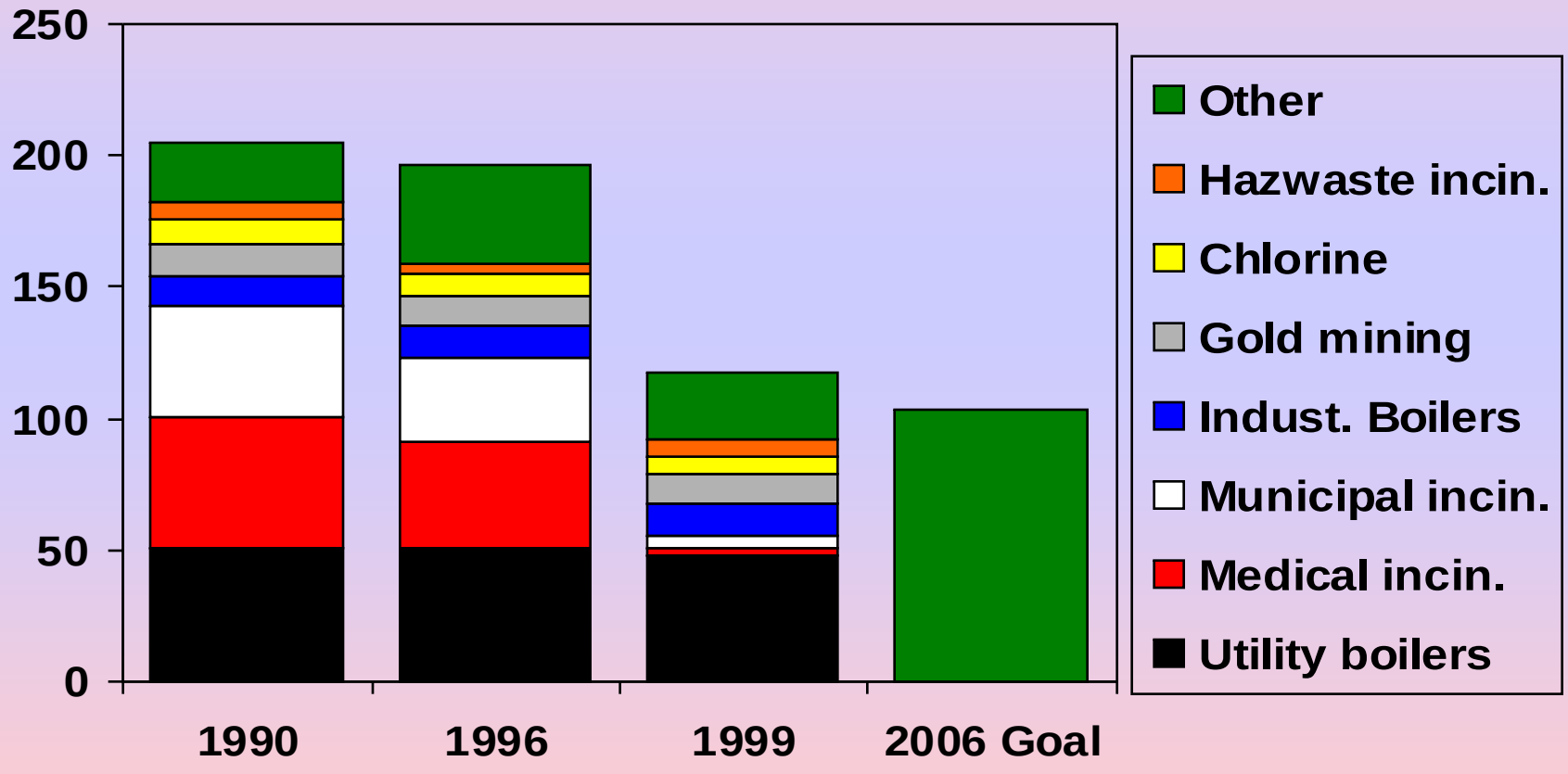
"Achieve by 2006 a 50% reduction in use and air emissions of mercury nationwide"

- Baselines:
  - Emissions: 1990
  - Use: 1995

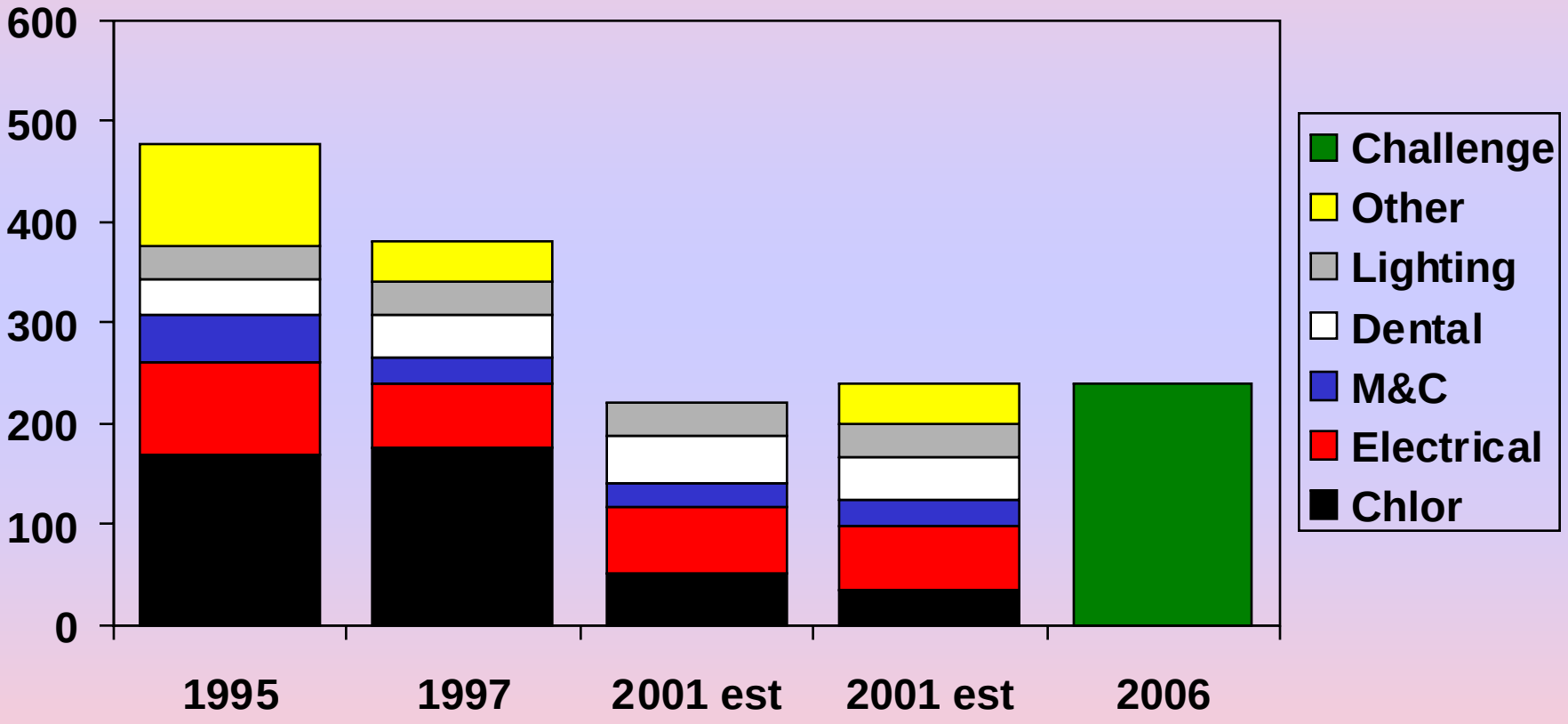
Progress (best guess):

- Emissions: > 40% reduction
- Use: > 50% reduction

U.S. Mercury Releases (tons)



U.S. Mercury Use (tons)



Significant Activities

- Utility Regulation
- New air emissions work practice standards for iron foundries
- Hospitals for Healthy Environment - 139 new partners signed up in the last year
- All existing hospital incinerators in Ontario closed as of December 6, 2003
- Ontario Regulation requiring dental offices to install amalgam separator came into effect November 15,2003

Chlor-alkali Industry

- Report on 2002 Mercury Use
- Mercury use remained at 30 tons– 81% reduction from 1995; 74% reduction on a capacity-adjusted basis
- One mercury cell plant closed—5 of 14 have closed since 1997

Dental Industry

- December 2, 2002 BTS Meeting
- Workgroup Co-Chairs Report on Options for Provincial State, Local Governments
- American Dental Association Launches Dental Amalgam Initiative
  - Best Management Practices for Amalgam Waste
- Canadian Dental Association working towards target of 95% reduction by 2005
- RCDSO requires Dentists to have amalgam separator(effective Nov 2003)
- Ontario Dental Waste Management Working Group distributing BMP flowcharts to all dentists in Ontario

Mercury in Scrap

- No mercury switches in 2003 model year autos
- Pilot projects– New York, Wisconsin, Michigan, Minnesota, Indiana
  - Ontario "Switch-out" program - expansion to other provinces
- Inclusion of "clean scrap" requirement in iron and steel foundry emissions standards
- But . . . Recovery of switches still limited in comparison with what's out there

Upcoming Activities

- Reducing mercury in lighting (this afternoon's meeting)
- Dental mercury report
- Continued mercury in scrap efforts–voluntary and regulatory processes
- continued tracking of mercury trends in the environment
- CEC mercury workshop (tomorrow)

Long Range Transport

Co-Leads:

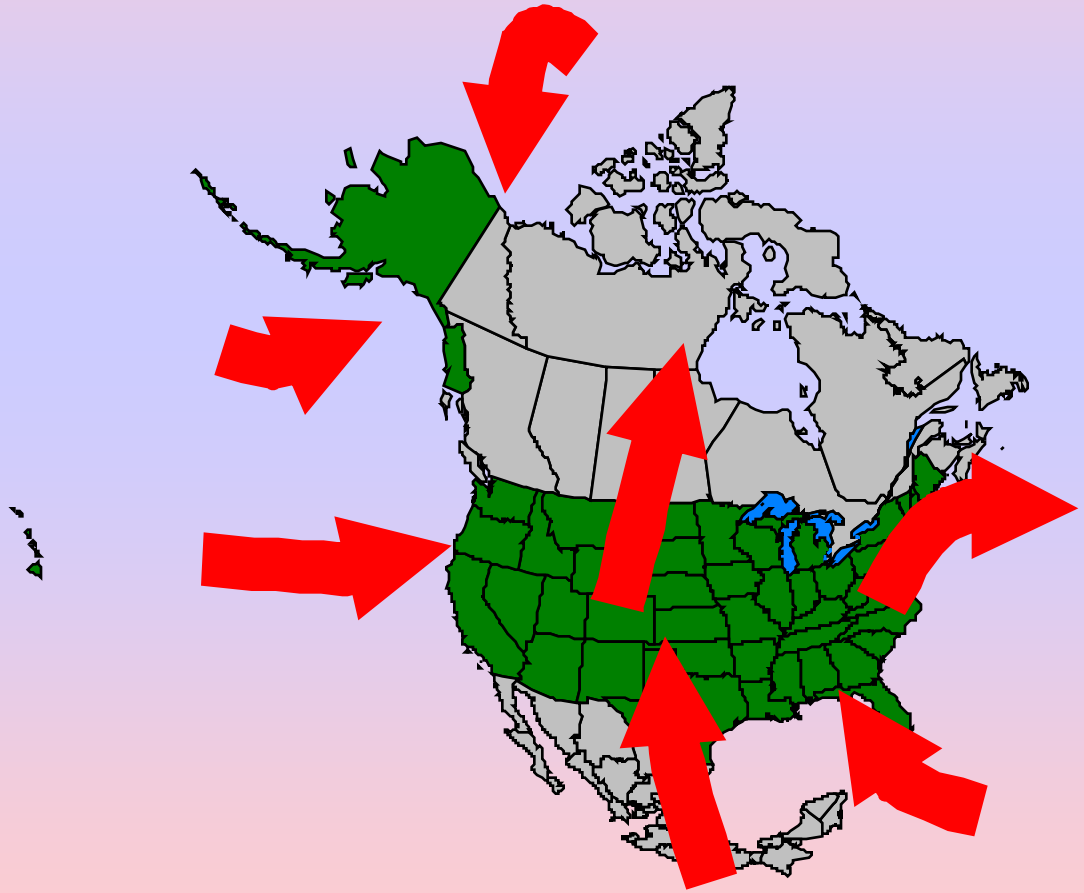
S. Venkatesh, Environment Canada

Todd Nettesheim, U.S. EPA

Long-Range Transport Challenge

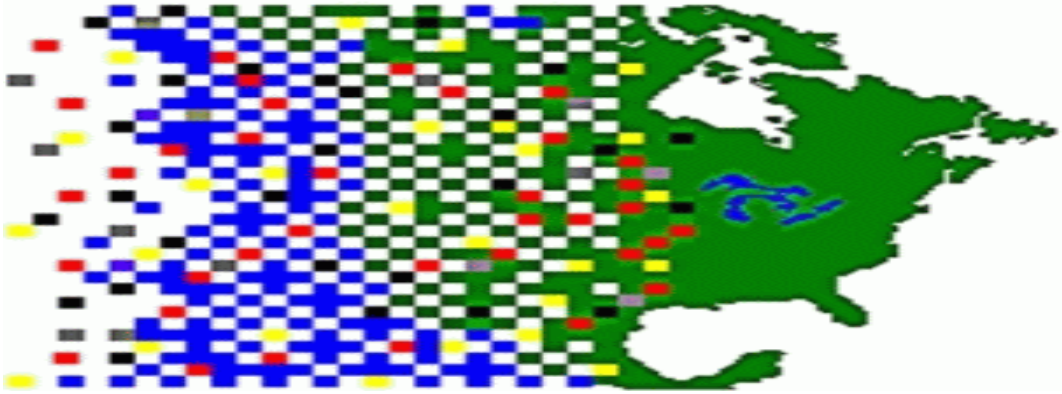
"Assess atmospheric inputs of Strategy substances to the Great Lakes. The aim of this effort is to evaluate and report jointly on the contribution and significance of long-range transport of Strategy substances from worldwide sources. If ongoing long-range sources are confirmed, work within international frameworks to reduce releases of such substances."

What have we learned about Long-Range Transport?



Long Range Transport Workshop 2003

Ann Arbor, Michigan USA



Great Lakes Binational Toxics Strategy

International Joint Commission

Commission For Environmental Cooperation

United States Environmental Protection Agency

Environment Canada

Great Lakes Binational Toxics Strategy

Long Range Transport Workshop 2003

September 16th & 17th, 2003

Campus Inn, Ann Arbor, Michigan USA

LRT Workshop: Goals & Objectives

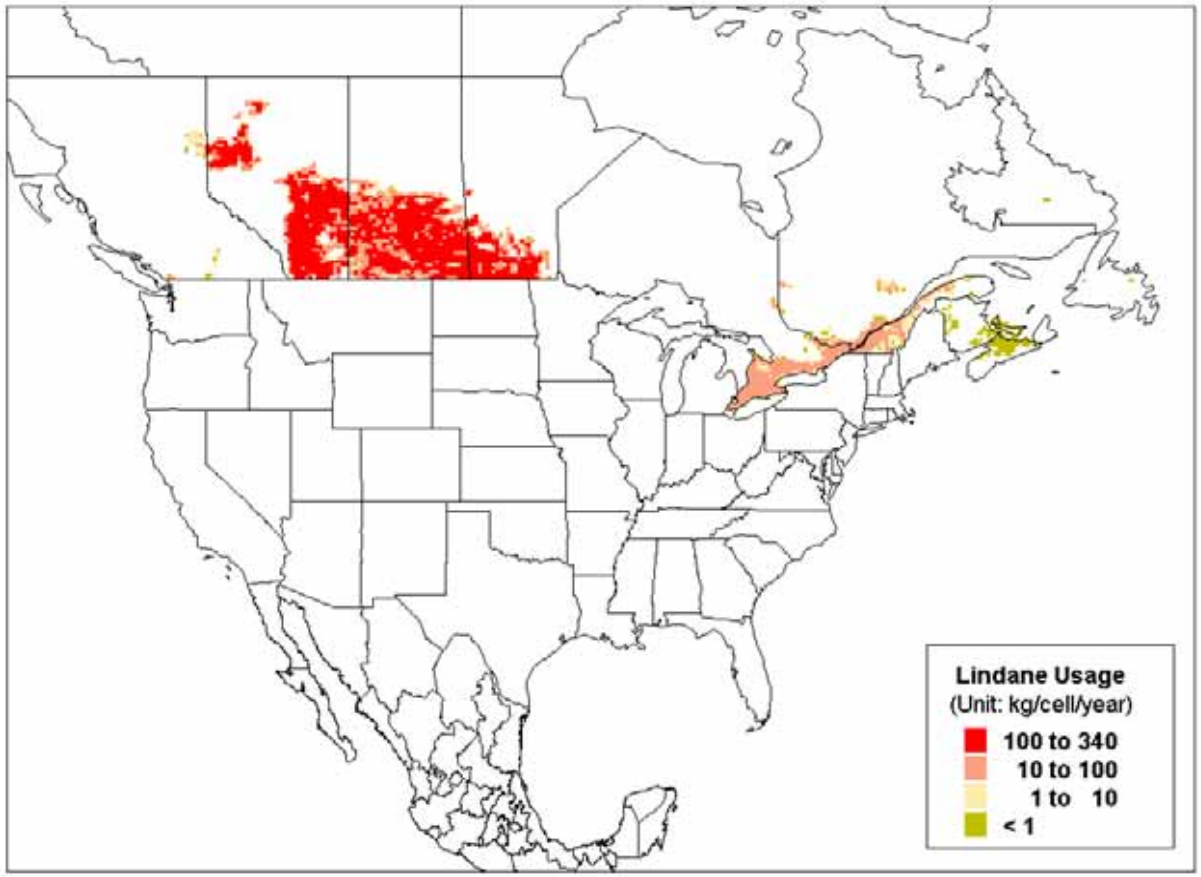
- Review recent scientific research
  - Background paper developed by Global Change Strategies International – Ottawa
  - Several distinguished North American and European scientists
- Identify critical knowledge gaps
- Provide recommendations on future activities necessary to adequately address long-range transport.
- Communicate and share workshop products

Emissions Inventory Actions

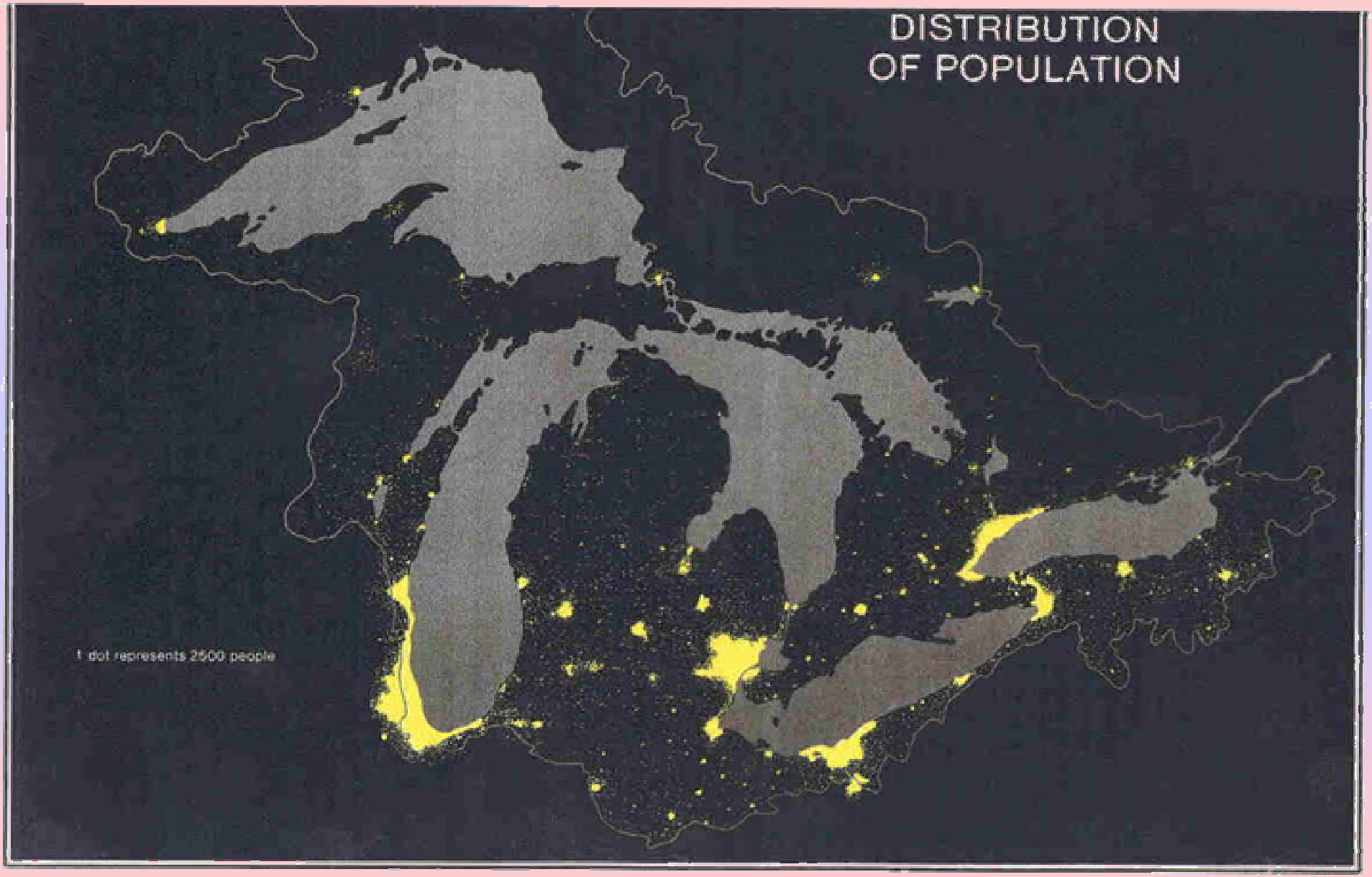
- Priority on North American PBTs
  - Local efforts are still VERY important (PCBs, Hg)
  - Authority is needed
- Improve transparency and access
- Improve review and accountability
- N.A./Global pesticide use and emissions
- Poorly characterized sources
  - Open burning (developing countries)
  - Residues in soil (re-emissions)
  - Mercury (speciation, mmHg)
- Aid developing countries

Usage Inventories:

Gridded Lindane Usage in Canada for 2000, Total: 500 t



THE GREAT LAKES BINATIONAL TOXICS STRATEGY



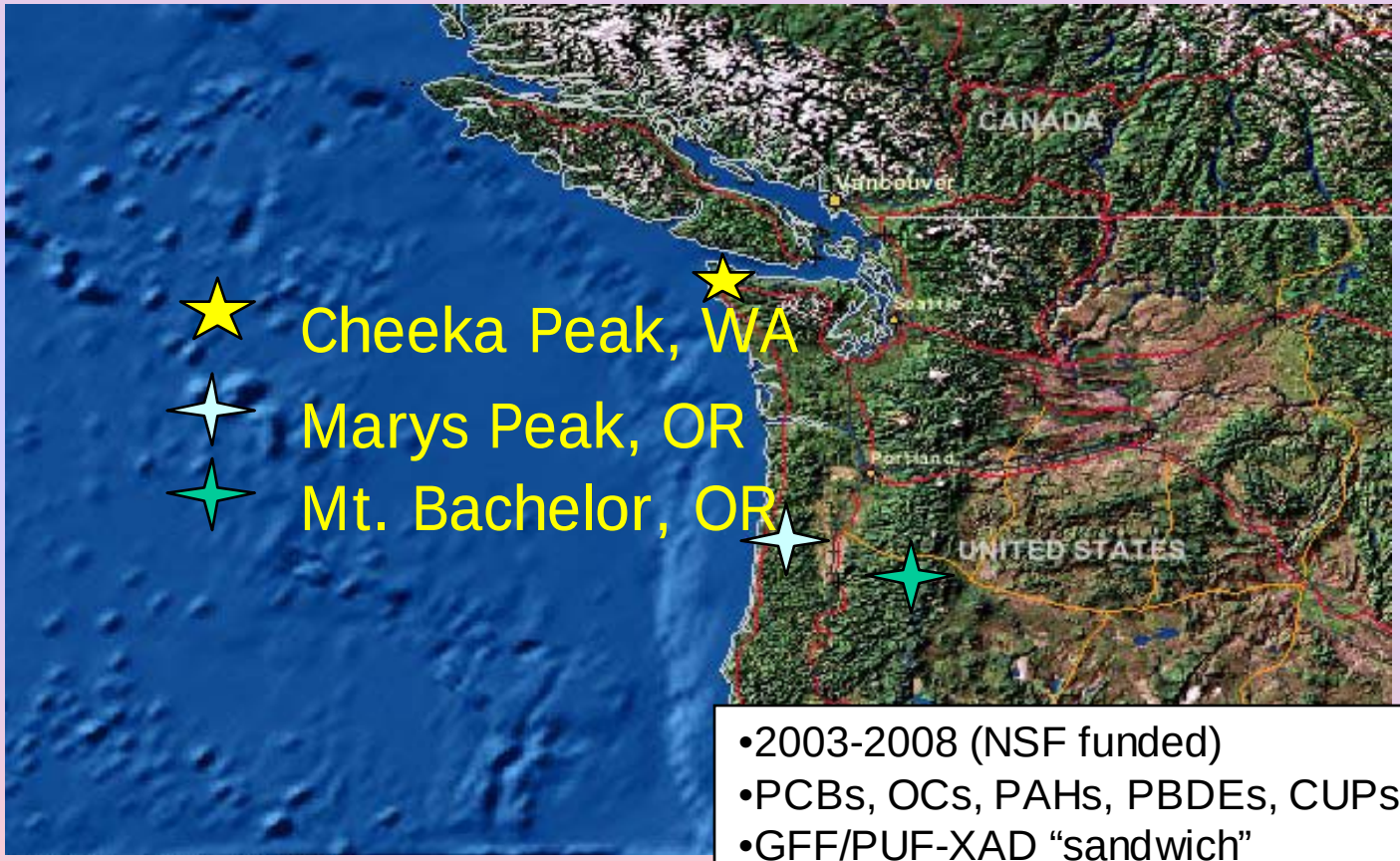
Canada

EPA

Monitoring Actions

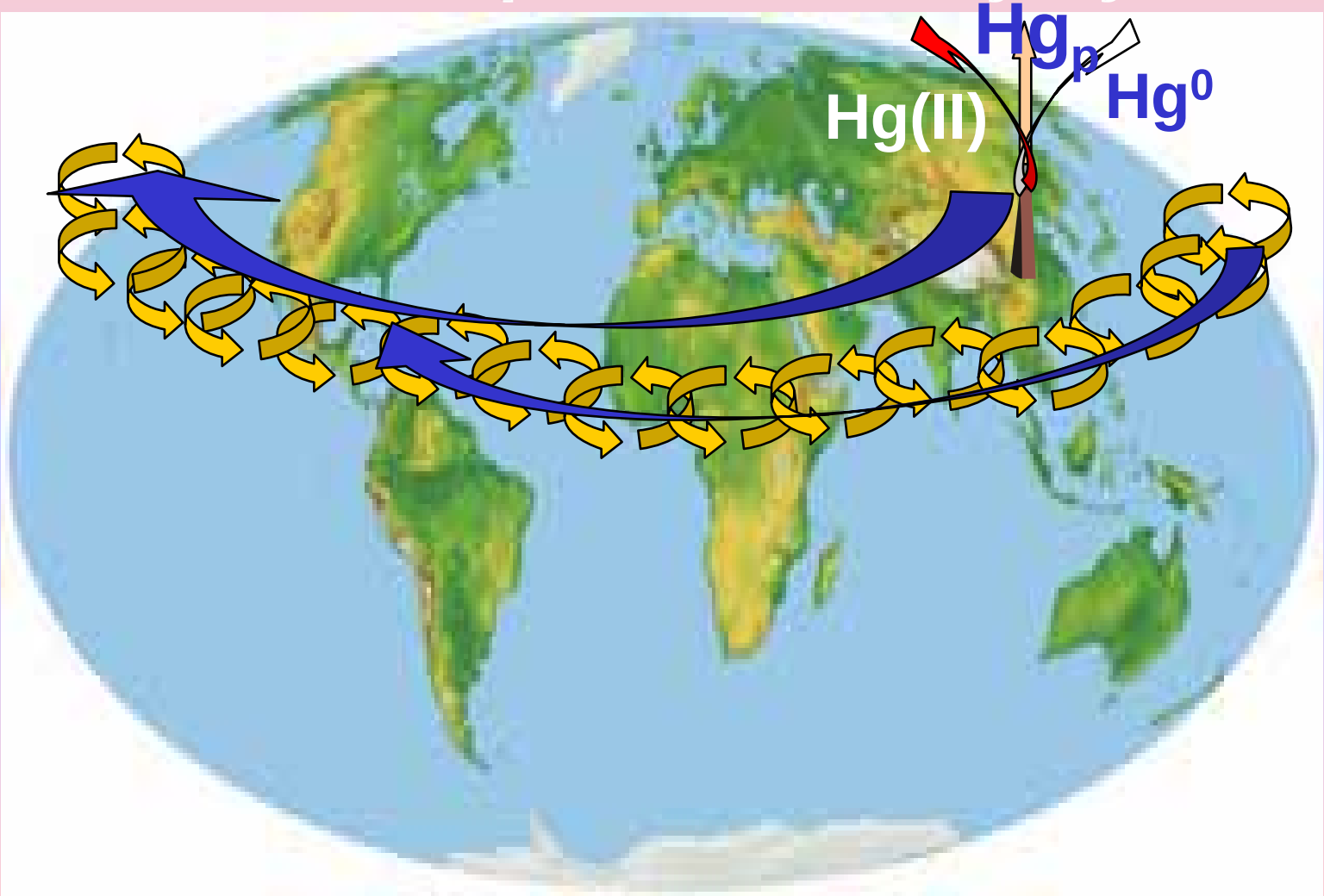
- Inter-network comparisons
- Improve Data Analysis
- Passive Sampling
- Sentinel sites
  - Trans-Pacific transport
  - Other transport pathways
- Utilize new monitoring methods
  - Highly intensive sampling studies
  - Emerging PBTs
- Mercury
  - Dry deposition
  - Throughfall, plant up-take, & litterfall
- IADN

Pacific Northwest Network of Air Monitoring Stations, U.S.



- 2003-2008 (NSF funded)
- PCBs, OCs, PAHs, PBDEs, CUPs
- GFF/PUF-XAD “sandwich”
- 24 hrs, 2/week or 3/month,event-based

Global Atmospheric Mercury Cycle ?

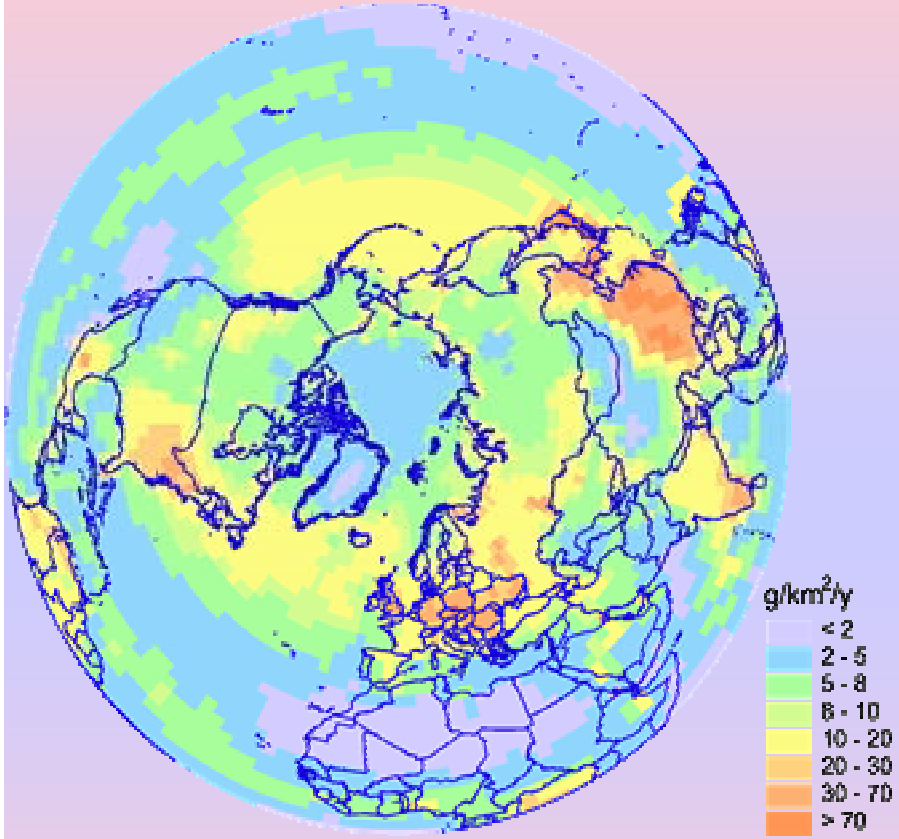


Rapid Oxidation, Deposition, Evasion ?

Modeling Actions

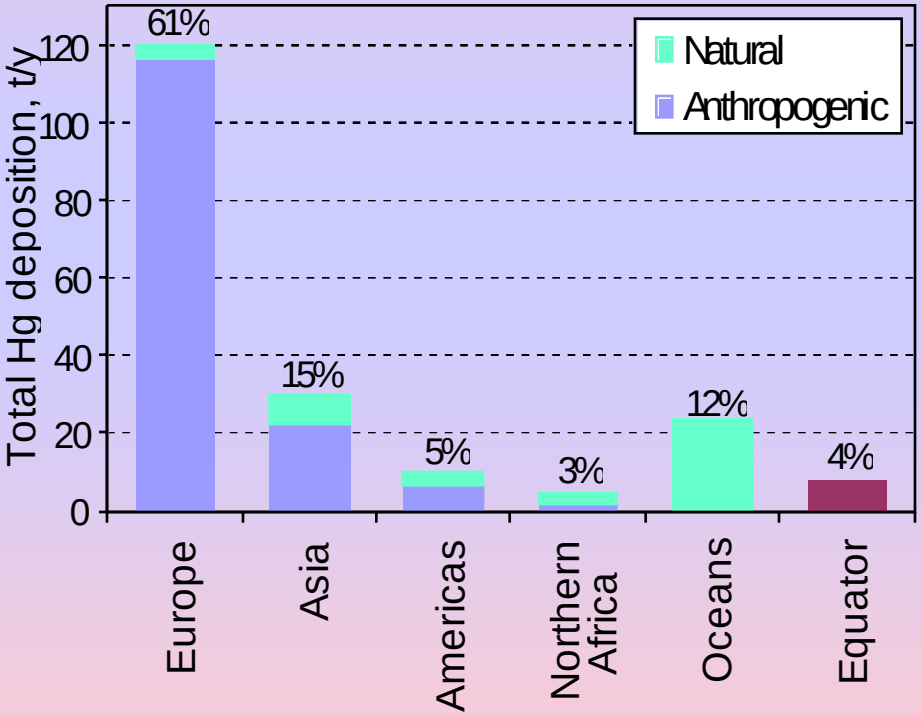
- Improve reliability of modeled estimates
  - EMEP Hg and POPs model inter-comparison studies
  - Great Lakes case study??
  - Use models of varying levels of complexity and scale
- Utilize new and improved POPs models
  - Fugacity-based (accounts for “grasshopping”)
- Knowledge Gaps
  - Chemical Kinetics (Hg, ozone, SO2, halides)
  - Emissions (natural, speciation, re-emission)
  - Chemical composition of RGM
  - Dry Deposition Velocities (including EGM)
  - Troposphere/Stratosphere Exchange
  - Volatilization Processes over Different Surfaces
  - Convective Transport

Modeling Results



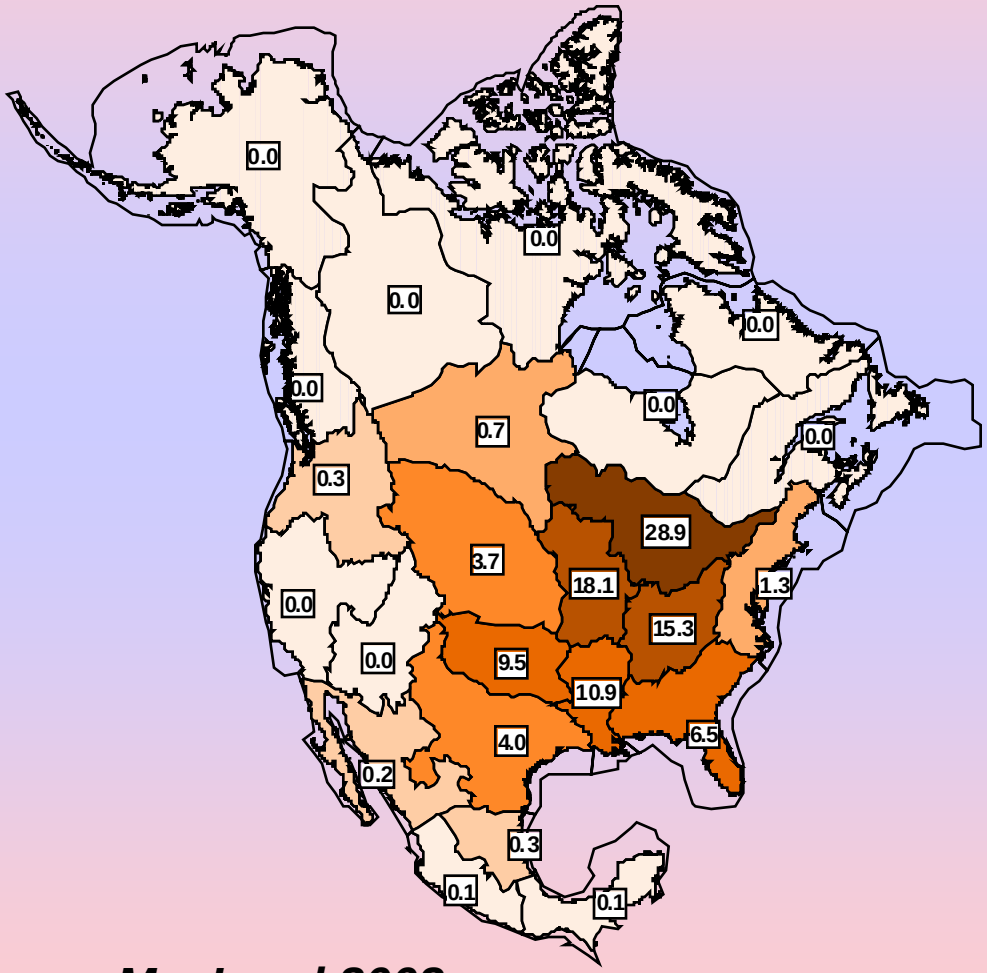
Annual deposition density of Hg in the Northern Hemisphere

<u>Europe:</u> contributions of global sources to deposition



EMEP/MSC-E

Toxaphene Atmospheric Loading



(Percentage of toxaphene deposited from the atmosphere to freshwater in the Great Lakes Basin due to usage in each region of North America)

Source: MacLeod 2003

Next Steps

- Draft "Ann Arbor Statement"
- 28 sets of comments received
- North American inter-comparison of mercury and POPs models
- Fugacity modeling for GLTBS substances
- Form national and international partnerships for monitoring networks
  - Sentinel sites - Mauna Loa and Alaska
- Workshop final report – March 2004
- *http://www.delta-institute.org/lrtworkshop/_main.html*

Special Thanks to:

Long Range Transport Workshop 2003
Ann Arbor, Michigan USA

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